ColdMark® Temperature Indicators

ColdMark indicators help you determine if your products have gone below an acceptable temperature. Without them, your product may be compromised from an unnoticed breach in your cold chain.

How can you be sure that unacceptable temperature during transit has not compromised your product's quality and efficacy?

Temperatures can vary dramatically during transit. The cargo hold of an aircraft can be colder than you planned. Your product may encounter unexpected delays and be stored in less than ideal conditions.

ColdMark temperature indicators provide a cost-effective tool for monitoring the temperature of your package. They are single-use devices that provide accurate, irreversible evidence of a below threshold deviation. The ColdMark turns from clear to violet when the temperature goes below a predetermined threshold.

With the information you gather from these indicators, you can make smarter decisions across your cold chain.

Benefits

- Delivers irreversible evidence of exposure to unacceptable temperature conditions
- Provides cost-effective solution for last mile monitoring
- Enables easy accept/reject decisions to be made
- Assists in verifying the adequacy of the cold chain packaging
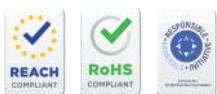- Aids in compliance with regulatory guidelines

Unactivated

Activated

ColdMark Key Specifications

|	
Temperature Threshold	-3°C / 26°F 0°C / 32°F 2°C / 36°F 5°C / 41°F 10°C / 50°F
Temperature Accuracy	± 1°C ± 2°F
Storage Conditions	Unused product must be stored above activation temperature and below 43°C / 110°F
Shelf Life	2 years from date of sale

SHOCKWATCH®

WarmMark® Temperature Indicators

WarmMark time-temperature indicators alert users of exposure to unacceptably high temperature conditions and the cumulative amount of time above the temperature threshold. Without them, a cold chain breach may go unnoticed resulting in a compromise in your product's quality.

Are you sure that unacceptable temperature during transit has not compromised your product's quality and efficacy?

Refrigeration equipment is not always reliable. Temperatures can vary dramatically during transit – trailer, distribution centers, storage. Your product may encounter unexpected delays in areas with less than ideal conditions.

WarmMark time-temperature indicators provide a cost-effective tool for monitoring the temperature of your package. They are single-use devices that provide accurate, irreversible evidence of a temperature excursion. With the information you gather from these indicators, you can make smarter decisions across your cold chain.
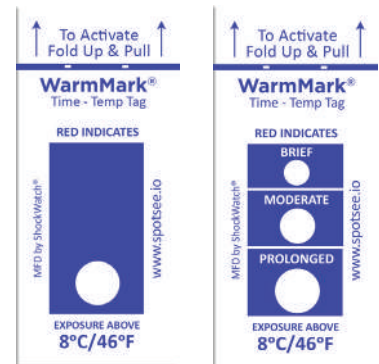
Benefits

- Delivers irreversible evidence of exposure to unacceptable temperature conditions
- Provides cost-effective solution for last mile monitoring
- Enables easy accept/reject decisions to be made
- Assists in verifying the adequacy of the cold chain packaging
- Aids in compliance with regulatory guidelines
- Saves money and space since field armable indicators require no special packaging or storage
- Available in pre-armed configurations for high volume packaging environments

WarmMark® Temperature Indicators

WarmMark Key Specifications

Temperature Accuracy	± 1°C / ± 2°F
Storage Conditions	Store below the response temperature and below 55% relative humidity for optimal shelf life.
Shelf Life	2 years from date of sale

Available Temperature   Run Out Times*

3 Window Indicators	Brief	Moderate	Prolonged	Single Window Indicators	
-18°C / 0°F	1 hr	3 hrs	12 hrs	8°C / 46°F	8 hrs
0°C / 32°F 8°C / 46°F 10°C / 50°F 20°C / 68°F	2 hours	12 hours	48 hours	8°C / 46°F	12 hrs
				25°C / 77°F	8 hrs
5°C / 41°F 25°C / 77°F 30°C / 86°F 37°C / 99°F	30 minutes	2 hours	8 hours		

Duo Indicator	Window 1	Window 2	Window 3	Window 4
10°C / 50°F	3 days	8 days	14 days	
34°C /93°F				within 20 minutes

| Long Run Indicators	Line 1	Line 2	Line 3	Line 4	Line 5
10°C / 50°F	12 hours	30 hours	60 hours	110 hours	168 hours
31°C /88°F	12 hours	30 hours	60 hours	110 hours	168 hours

WarmMark Use Instructions

1. All WarmMark breach window(s) should be white prior to arming the device.

2. Before arming, the WarmMark indicator should be placed in an environment at least 5°C (9°F) below the WarmMark's activation threshold temperature for a minimum of 30 minutes.

3. To arm the WarmMark indicator, fold up and pull out the indicator's activation tab until the tab and barrier film have been completely removed.

4. If using a WarmMark indicator with a threshold temperature below the ambient temperature, immediately place the indicator in the environment to be monitored to avoid early activation.

5. Remove the adhesive liner from the WarmMark and adhere the indicator to a clean, dry surface.
   a. The WarmMark should be located where it will be visible to the receiver of the monitored shipment.
   b. The WarmMark can be adhered directly to the product being monitored or located inside the packaging.
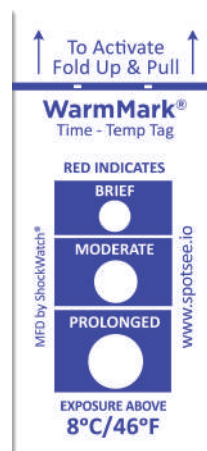
*Run out times are based on a constant temperature 2°C above the indicator threshold. Exposure to higher temperatures will result in faster run out.

SHOCKWATCH®

Temperature Recorders

The global cold chain presents a number of risks to your product. Every link in the supply chain is crucial to product quality. Monitoring your products provides information necessary to make critical decisions.

LOG•IC® Temperature Recorders

Refrigeration equipment is not always reliable. Multiple handlers may come in contact with the package during its journey. Unexpected delays and neglect at any stage of production or distribution can cause exposure to unacceptable temperatures. These types of risks may occur in storage before the product leaves a facility, in transit or after it arrives at its destination. How you can be sure that a cold chain breach has not compromised your product's quality?

LOG•IC is a cost-effective temperature recorder that indicates if your product has been exposed to temperatures that could negatively affect product quality or safety. While many other temperature recorders limit you to one download before stopping the recording process, LOG•IC allows you to scan and view tag data repeatedly, allowing you to take measurements at any point in the cold chain.

LOG•IC can be tailored for specific applications such as monitoring product core temperatures with a stainless steel probe, or inside validated packaging with a ribbon cable, or extreme cold with a dry ice solution.

Features

- Captures data every 60 seconds
- Up to eight temperature alarm thresholds
- Validated and FDA 21 CFR Part 11-compliant reports
- Up to 255 uses per device
- Available with Stainless and Ribbon Probes

**Dry Ice Single Use
w/ Ribbon Probe**


**LOG•IC
Single-Use**

**LOG•IC
Multi-Use**

**LOG•IC
255 Use**

Temperature Recorders

Key Specifications

	Standard	with Probe	Dry Ice Probe
Temperature Measurement Range	-30°C to 75°C -22°F to 167°F		-80°C to 75°C -112°F to 167°F
Temperature Accuracy:			
-80°C to -30°C	N/A	N/A	± 3°C
-30°C to 2°C	± 0.5°C	± 1°C	± 1°C
2°C to 8°C	± 0.5°C	± 0.5°C	± 1°C
8°C to 75°C	± 0.5°C	± 1°C	± 1°C
-112°F to -22°F	N/A	N/A	± 6°F
22°F to 36°F	± 1°F	± 2°F	± 2°F
36°F to 46°F	± 1°F	± 1°F	± 2°F
46°F to 167°F	± 1°F	± 2°F	± 2°F
Threshold Settings	8 configurable excursions thresholds		
Memory Capacity	4000 logged data points / 16 million histogram temperature readings		
Data Retrieval	USB plus RF		
Wireless Technology	Semi-passive RFID		
Packaging	NEMA 4 / IP 66		
Product Size	3.5in x 1.75in x 0.25in 9cm x 5cm x 0.82cm		2.28in x 2.28in x 0.07in 5.79cm x 5.79cm x 0.17cm
Cable Length	N/A	24in 60.96cm	24in 60.96cm
Battery Life	Up to 3 years		
Calibration	Factory-calibrated sensor, NIST-traceable (3-point)		
Weight	29g		19.50g

Product Description	Part Number
Single-Use Temperature Recorder	L-3100
Multi-Use Temperature Recorder (26 uses)	L-3200
Multi-Use Temperature Recorder / Stainless Steel Probe (26 uses)	L-3210
Multi-Use Temperature Recorder / Ribbon Probe (26 uses)	L-3230
Multi-Use Temperature Recorder (255 Uses)	L-3300
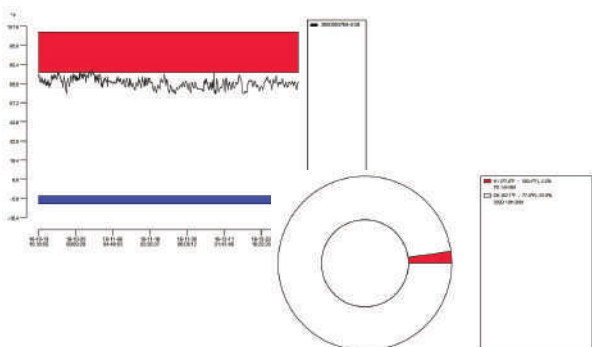
Features

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- Up to eight temperature alarm thresholds
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- Up to 255 uses per device
- Available with Stainless and Ribbon Probes
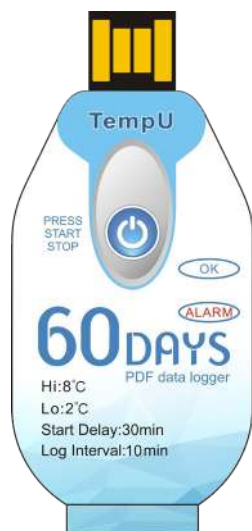
The TempU temperature data logger is a low-cost recorder that alerts you if your shipment has fallen out of the refrigeration zone (2°-8°C). Absolutely no software and preset temperature alarm limits make it a simple solution for monitoring your refrigerated shipments.

Features:

- Captures data every 10 minutes
- +/- 0.5°C temperature accuracy
- No software
- Preset alarms for below 2°C C and above 8°C
- Simple on/off operation with button press
- LED indicator of recorder status
- Automatic PDF reporting
- 2 year battery life

Specifications:

Recording Options	Single-Use
Temperature Range	-30°C to +60°C
Temperature Accuracy	±0.5°C (-20°C/+40°C); ±1°C (other range)
Temperature Resolution	0.1°C
Data Storage Capacity	10,000 Readings
Shelf Life/Battery	2 years / CR2032 button cell
Recording Interval	10 minutes
Recording Duration	60 days (standard, others on request)
Temperature Alarm	<2°C and >8°C
Alarm Delay	0 minutes
Alarm Type	The red LED will flash every 10s, if the temperature has been out of range
Start Delay	30 mins
Report Generation	Automatic PDF report
Waterproof Level	IP67 (with Seal-Bag)
Dimensions	69mm x 33mm x 5mm
Weight	10g

How to Use:

Press the button to start

Pack into shipment

Log temperature

Insert into USB port to create PDF report

SpotBot™ BLE Overview

Spot Potential Damage

The SpotBot BLE makes the supply chain transparent. Once attached to the shipment, the SpotBot BLE measures and records temperature, humidity, tilt, and shock, with the data visualized through a mobile applicaton. The limits of each parameter can be individually configured, and any violation is traceable (with time/date stamp) and clearly assignable throughout the entire supply chain.

Product Benefits

- Cost-effective, simple, all-purpose and reliable way to bring transparency to the entire supply chain, with exceptional Bosch quality.

- The SpotBot BLE gives the initiator of a delivery peace of mind and supply chain transparency. In the event that a parameter threshold is exceeded, the SpotBot BLE provides verifiable proof and a reliable indication of possible primary and secondary damage.

- Individual configurability, ease of use and integration with little effort and without prior knowledge of the processes of a logistics chain.

- Provides an added value for every logistical effort. It creates trust between partners and provides important data for the optimization of logistics processes. If there is no parameter violation, the SpotBot BLE is the evidence of a failure-free transport chain.

Characteristic Features

- Simultaneous monitoring of multiple crucial parameters
- Up to two years battery lifetime
- Cost-effective, simple, and robust
- Free and user-friendly mobile application

Shock **Humidity** **Temperature** **Tilt**

SpotBot™ BLE Technical Data

MEASUREMENT PARAMETERS

SHOCK   HUMIDITY   TEMPERATURE   TILT

APPLICATION ADVANTAGES

• Creates transparency within the entire supply chain

• Simplified configuration and visualization via mobile application

• Battery with a long lifetime resulting in less handling effort

DEVICE SPECIFICATION

Dimension (LxWxH)	101.8 mm x 91 mm x25 mm
Weight	100g
Power Supply	CR 123A Lithium Battery, 1400 mAh
Battery Lifetime	2 Years (10 min. measuring cycle, +25°C)
Enclosure Protection Class	IP 54
Electrical Protection Class	III
Measuring Interval	1 min to 4 hours (selectable)
Memory Capacity	2 Years (15 min. measuring cycle, typical usage

OPERATING RANGE

Operating Temperature Range	-25°C to +80°C
Storage Temperature Range	0°C to +40°C
Humidity Range	0% rH to 100% rH (non condensing)
Shock / Acceleration Range	±8g per axis ±13.8g modulus

SpotBot BLE™ Technical Data

ACCURACY

Temperature	±0.5°C (0°C to +60°C)
	±1°C (-25°C to +80°C)
Humidity	±5% rH typical
	±10% rH maximum
	(20% rH to 80% rH at 25°C)
Shock / Acceleration	±10%

RESOLUTION

Temperature	0.5°C
Humidity	1% rH
Shock / Acceleration	0.1g

COMMUNICATION

Bluetooth Low Energy

Range	Up to 40 m (dependent on external influences)

USER INTERFACE

|	
App	Free smartphone application for configuration and data analysis
Status LED	Indication of device status, battery level and communication

DIMENSIONAL DRAWING

SpotSee™
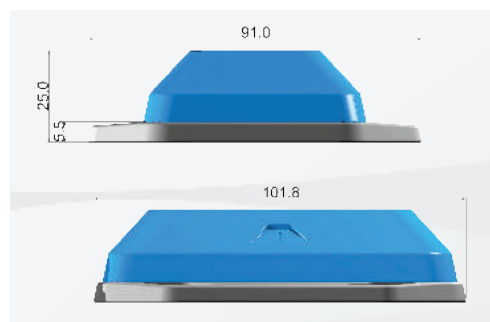
SpotBot Cellular Overview

Products damaged during transport? By using SpotBot® Cellular to track cargo through the supply chain, you can pinpoint issues during transportation so that they can be remedied and avoided in the future. The visibility to impact and temperature data that SpotBot Cellular provides can help you realize significant savings of both time and money by ensuring that your product reaches the customer without incident.

SpotBot Cellular is a standalone device that delivers tri-axial impact monitoring, temperature recording and location tracking through cellular connectivity. It features real-time visualization through the SpotSee Cloud. Access your data in the cloud from any web-based device. The SpotBot Cellular transmits information using cellular technology, so the unit does not require line of sight to a satellite for position or communication.
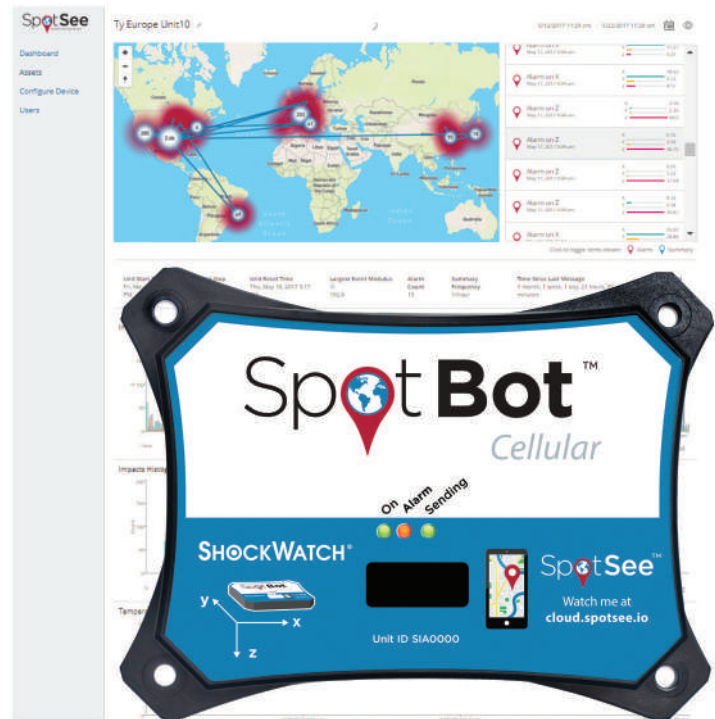
Features

Best in Class Impact Data

SpotBot Cellular generates accurate data on impacts up to 65G providing more than four times (4X) the range of the best competitive alternative (which captures impacts up to 16G). The SpotBot Cellular range of impact monitoring is best suited for products between 100-60,000 lbs.

Longest Battery Life

With off-the-shelf lithium batteries, SpotBot Cellular delivers 75 days of monitoring (set to hourly summary reporting). This represents a battery life that is 50% (1.5X) more than next best competitor.

Flexible Settings & Download Capabilities

The user easily defines impact and temperature settings specific to the product being monitored and SpotBot Cellular will deliver a location and time stamp of alerts from conditions over the threshold. After the trip, the user can easily download a PDF file with the top ten largest impacts, a CSV file with the top 50 largest impacts, and a slot-time report from the SpotBot Cellular.

The SpotSee Cloud is where trip data is aggregated in real-time. The graphs are easy to read and include data such as specifics of impact with locations, impacts over time, histogram, and temperature.

Features

- Access to data from anywhere with a dedicated web portal

- Real-time reporting and tracking of incidents

- Alarms with location, time, impact g-level, direction of impact, and temperature

- Impacts-over-time visualization of each asset

- Histogram the asset's impacts

- Temperature-over-time graph
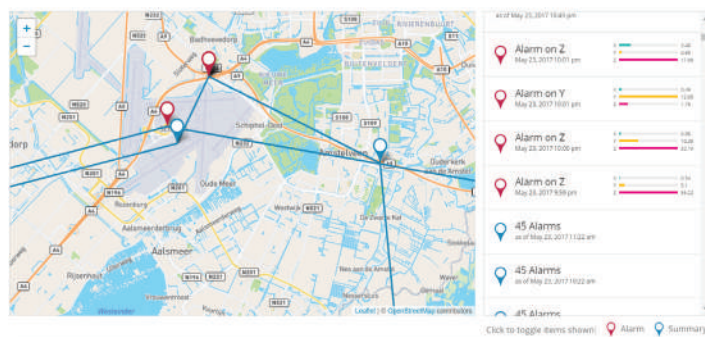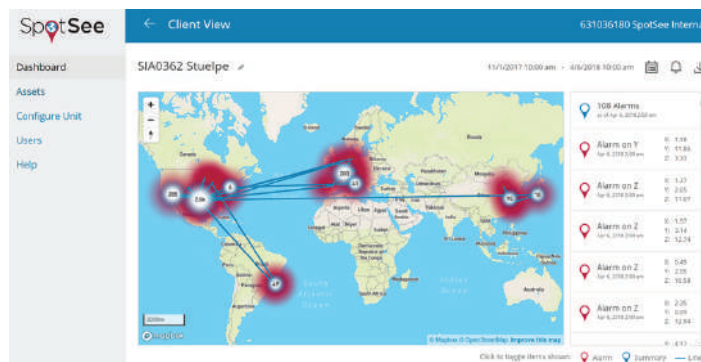
Real-time Reporting

If an unacceptable impact on temperature condition occurs the SpotSee Cloud receives that information in real-time*. Summary information is sent to the cloud at predetermined intervals so you always know the status of your asset.

Detailed Alarm Data

See all your asset alarms including location, time, impact g-level, direction of impact and temperature. View excursions over time so you can easily spot areas of concern. The histogram is a quick view of the units impacts grouped by g-level so you know quickly if repeated impacts may be the cause of damage.

*Notifications can be set up to deliver alerts immediately to concerned parties