



WarmMark® Technical Data Sheet

Introduction

The WarmMark ascending temperature indicator is a simple solution for monitoring temperature sensitive products. Simply pull the activation tab and begin monitoring your product. A white to red color change informs you when the temperature has reached unacceptable levels and your product quality may have been compromised.

FEATURES
<ul style="list-style-type: none"> • Field-activated ascending temperature indicators • Irreversible color change when temperature breach occurs • Wide variety of temperatures to accommodate customer requirements

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ShockWatch® WarmMark® Technical Data

Specifications

Indication Type	Visual, irreversible white to red color change in activation window
Activation Method	Manual: Pull-tab
Activation Temperature Levels	Sensitivities available between -18°C and 37°C. See Product Selection table for details
Temperature Accuracy	±1°C / ±2°F
Run Out Time	See Product Selection for details
Product Life	2 years from date of sale
Mounting Method	Pressure-sensitive adhesive (see Appendix B)
Storage Conditions	Store in a cool dark environment, below the response temperature of the indicator; 35-55% RH
Dimensions	Short-Run: 1.81 x 0.75 x 0.06in / 46 x 19 x 1.5mm Long-Run & Duo: 3.88 x 0.75. x 0.06in / 98.1 x 19 x 1.5mm

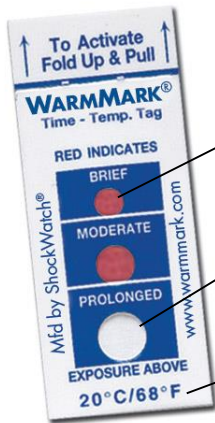
Product Selection

WarmMark should be used when monitoring products that must be maintained at temperatures below a specified temperature.

WarmMark Short-Run

WM Short-Run Part Number	Activation Temp	Run-Out Time*		
		Window 1 Brief	Window 2 Moderate	Window 3 Prolonged
WM -18/0	-18°C/0°F	1 hour	3 hours	12 hours
WM 0/32	0°C/32°F	2 hours	12 hours	48 hours
WM 5/41	5°C/41°F	30 minutes	2 hours	8 hours
WM 8/46	8°C/46°F	2 hours	12 hours	48 hours
WM 8/46 - 8	8°C/46°F	--	--	8 hours
WM 8/46 - 12	8°C/46°F	--	--	12 hours
WM 10/50	10°C/50°F	2 hours	12 hours	48 hours
WM 20/68	20°C/68°F	2 hours	12 hours	48 hours
WM 25/77	25°C/77°F	30 minutes	2 hours	8 hours
WM 25/77 - 8	25°C/77°F	--	--	8 hours
WM 30/86	30°C/86°F	30 minutes	2 hours	8 hours
WM 37/99	37°C/99°F	30 minutes	2 hours	8 hours

* Run-out times are based on a 2°C excursion above the response temperature. Readings are affected by severity of temperature excursion. Higher temperatures will cause run-out to occur faster than stated.



Color indicates exposure to warmer-than-acceptable conditions

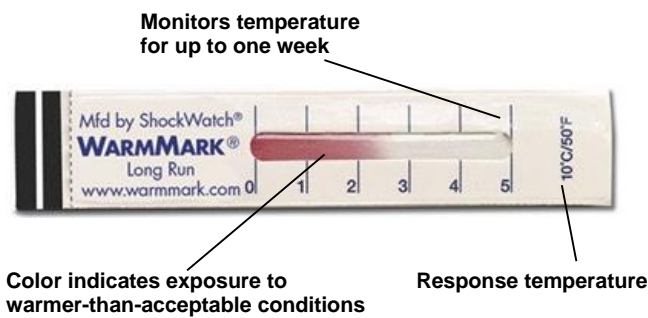
Monitors temperature for up to 8, 12, or 48 hours, depending on model

Response temperatures

WarmMark Long-Run

WM Long-Run Part Number	Threshold Temp	Run-Out Time*				
		Line 1	Line 2	Line 3	Line 4	Line 5
WL 10/50	10°C/50°F	12 hours	30 hours	60 hours	110 hours	168 hours
WL 31/88	31°C/88°F	12 hours	30 hours	60 hours	110 hours	168 hours

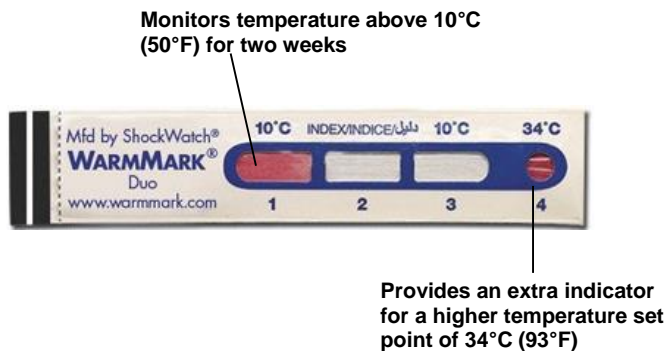
* Run-out times are based on a 2°C excursion above the response temperature. Readings are affected by severity of temperature excursion. Higher temperatures will cause run-out to occur faster than stated.



WarmMark Duo

WM Duo Part Number	Threshold Temp	Run-Out Time*			
		Window 1	Window 2	Window 3	Window 4
WD 10-34	10°C/50°F	3 days	8 days	14 days	-
	34°C/93°F	-	-	-	Within 30 mins

* Run-out times are based on a 2°C excursion above the response temperature. Readings are affected by severity of temperature excursion. Higher temperatures will cause run-out to occur faster than stated.



How to Mount

Temperature indicators are best suited for monitoring product or the controlled environment of the product.

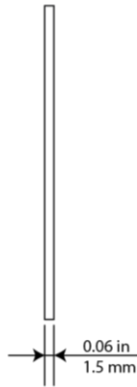
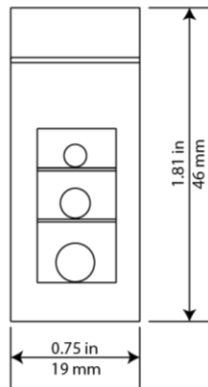
WarmMark ascending temperature indicators are best used when mounted directly to the product being monitored or when placed inside the product shipper. Indicators should not be placed directly on gel packs, phase change materials, etc. as this will result in measuring the temperature of the packaging material components instead of the temperature of the product or environment.

In rare cases, temperature indicators are mounted on external packaging to monitor ambient temperature conditions.

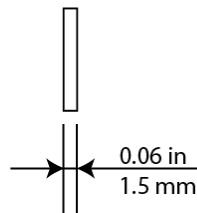
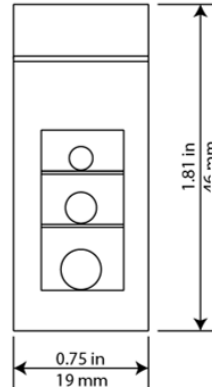
Drawings

WarmMark Short-Run

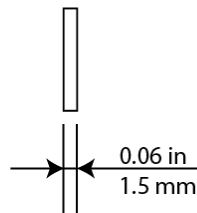
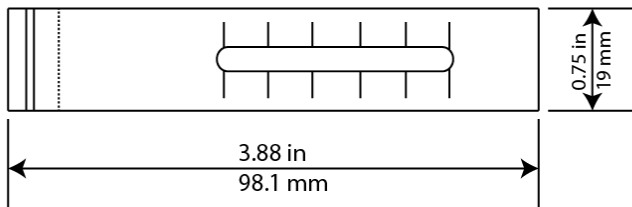
Standard WarmMark



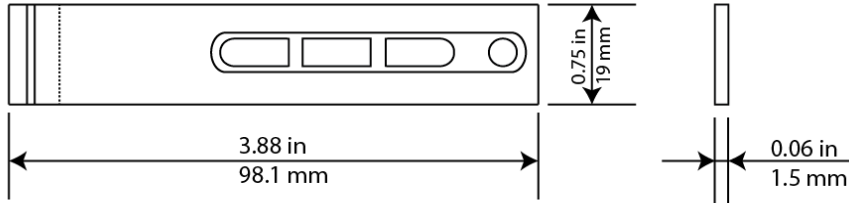
Single Window WarmMark



WarmMark Long-Run



WarmMark Duo



Related Products

ColdMark temperature indicators are available to monitor descending temperatures. Contact your ShockWatch Regional Manager or Local Distributor for more information.

Ordering Information

Part Number	Description	Minimum Order Quantity
WarmMark Short Run Temperature Indicators		
WM -18/0	WarmMark Short-Run -18C/0F	100
WM 0/32	WarmMark Short-Run 0C/32F	100
WM 5/41	WarmMark Short-Run 5C/41F	100
WM 8/46	WarmMark Short-Run 8C/46F	100
WM 8/46 – 8	WarmMark Short-Run 8C/46F – Single Window	100
WM 8/46 – 12	WarmMark Short-Run 8C/46F – Single Window	100
WM 10/50	WarmMark Short-Run 10C/50F	100
WM 20/68	WarmMark Short-Run 20C/68F	100
WM 25/77	WarmMark Short-Run 25C/77F	100
WM 25/77 - 8	WarmMark Short-Run 25C/77F – Single Window	100
WM 30/86	WarmMark Short-Run 30C/86F	100
WM 37/99	WarmMark Short-Run 37C/99F	100
WarmMark Long Run Temperature Indicators		
WL 10/50	WarmMark Long-Run 10C/50F	10,000
WL 31/88	WarmMark Long-Run 31C/88F	10,000
WarmMark Duo Temperature Indicators		
WD 10-34	WarmMark Duo 10C & 34C	100



Technical Support

If you are unsure of how to use or interpret the WarmMark, please contact ShockWatch Technical Support at (800) 527-9497 or (214) 736-4580.

Warranty

If a Product fails to conform to the specifications stated in this document, the product may be returned to ShockWatch at any time prior to the product's specified expiration date or, if no expiration date is specified, within one year from the date of shipment. ShockWatch shall either refund the purchase price (without interest), or repair and/or replace the product (or, in the case of services, re-perform such services) at no additional cost. The warranty is void if the defect has resulted from accident, misuse, abuse or misapplication. Any product which is identified as defective during the warranty period and is returned to ShockWatch with a Return Material Authorization (RMA) number (which must be obtained from ShockWatch prior to any return) within thirty (30) days after discovery of the defect with a written description of the defect will be replaced by ShockWatch.

Limitation of Liability

Seller makes no warranty, expressed or implied, except that the Products sold hereunder shall conform to Seller's written specifications for such Products as in effect and provided to Buyer by Seller at the time of sale of such Products to Buyer ("Seller's Specifications").

WARRANTY SET FORTH ABOVE IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, REPRESENTATIONS, AND COVENANTS, EXPRESS OR IMPLIED, STATUTORY, UNDER COMMON LAW OR OTHERWISE. EXCEPT AS PROVIDED IN THE SELLER'S TERMS & CONDITIONS., SELLER MAKES NO, AND EXPRESSLY DISCLAIMS, AND BUYER HEREBY EXPRESSLY WAIVES, IN EACH CASE TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL WARRANTIES, GUARANTEES, PROMISES, OR REPRESENTATIONS WITH RESPECT TO THE PRODUCTS, WHETHER WRITTEN, ORAL, EXPRESSED, OR IMPLIED, AND WHETHER IN FACT OR BY OPERATION OF LAW, STATUTORY, OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR SUITABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR ANY WARRANTY OF NON-INFRINGEMENT (INCLUDING PATENT INFRINGEMENT, BOTH DIRECT AND INDIRECT, AND INCLUDING BOTH CONTRIBUTORY AND INDUCING PATENT INFRINGEMENT).

CONDITIONS, BUYER ASSUMES ALL RISK WHATSOEVER, AND SELLER (AND SELLER'S SHAREHOLDERS, DIRECTORS, MANAGERS, OFFICERS, EMPLOYEES, AND OTHER AFFILIATES (COLLECTIVELY, "SELLER'S AFFILIATES")) SHALL NOT BE LIABLE, FOR ANY LOSS, DAMAGE, OR LIABILITY INCURRED BY BUYER OR BY ANY USER OF ANY PRODUCTS ARISING OUT OF THE USE OF SUCH PRODUCTS, WHETHER SINGLY OR IN CONJUNCTION WITH ANY OTHER EQUIPMENT OR PROCESS, AND WHETHER DUE TO THE NEGLIGENCE OF SELLER OR ANY OTHER PERSON OR ENTITY. THE LIABILITY OF SELLER AND SELLER'S AFFILIATES FOR ANY FAILURE OF A PRODUCT TO CONFORM TO SELLER'S SPECIFICATIONS SHALL BE LIMITED EXCLUSIVELY TO, AT SELLER'S ELECTION, EITHER (1) REFUND OF THE PURCHASE PRICE PAID BY BUYER FOR SUCH PRODUCT (WITHOUT INTEREST) OR (2) REPAIR OR REPLACEMENT OF SUCH PRODUCT (OR, IN THE CASE OF SERVICES, REPERFORMANCE OF SUCH SERVICES). IN THE EVENT A COURT OF COMPETENT JURISDICTION SHOULD RULE THAT SELLER OR ANY OF SELLER'S AFFILIATES IS ANSWERABLE IN DAMAGES NOTWITHSTANDING THE LIMITATION OF LIABILITY SET FORTH HEREIN, THE AGGREGATE AMOUNT OF SUCH DAMAGES FOR WHICH SELLER AND SELLER'S AFFILIATES ARE LIABLE SHALL NOT EXCEED THE TOTAL OF ALL PAYMENTS MADE BY BUYER TO SELLER UNDER THE AGREEMENT WITH RESPECT TO THE RELEVANT PRODUCTS. SELLER AND SELLER'S AFFILIATES SHALL IN NO EVENT BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, OR EXEMPLARY DAMAGES, OR FOR DIMINUTION IN VALUE, LOST PROFITS, OR LOST BUSINESS OPPORTUNITY DAMAGES OF ANY NATURE, ARISING OUT OF OR RELATING IN ANY WAY TO THE PERFORMANCE UNDER OR BREACH OF THE AGREEMENT OR THE PURCHASE OR SALE OR USE OF THE PRODUCTS.

NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, BUYER EXPRESSLY ACKNOWLEDGES THAT SELLER HAS TESTED THE PRODUCTS ONLY AS SET FORTH IN THE SELLER'S SPECIFICATIONS AND NOT FOR USE WITH OR INCORPORATION INTO ANY PARTICULAR APPLICATION, AND BUYER ASSUMES AND BEARS ALL RISK AND RESPONSIBILITY OF DETERMINING THE SUITABILITY OF THE PRODUCTS FOR THE PURPOSE INTENDED BY BUYER OR BUYER'S CUSTOMER. BUYER SHALL NOT MAKE ANY REPRESENTATION TO ANY THIRD PARTY (1) REGARDING THE RELIABILITY OR ACCURACY OF THE PRODUCTS EXCEPT AS EXPRESSLY SET FORTH IN SELLER'S SPECIFICATIONS OR (2) TO THE EFFECT THAT SELLER HAS TESTED THE PRODUCTS FOR THE USE INTENDED BY BUYER OR SUCH THIRD PARTY.

BUYER SHALL INDEMNIFY, DEFEND, AND HOLD SELLER AND SELLER'S AFFILIATES HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, LOSSES, DAMAGES, RESPONSIBILITIES, OBLIGATIONS, LIABILITIES, COSTS AND EXPENSES (INCLUDING WITHOUT LIMITATION ATTORNEY FEES, COURT COSTS, COSTS OF ALTERNATIVE DISPUTE RESOLUTION PROCEEDINGS, AND COSTS OF SETTLEMENT) BROUGHT BY ANY PARTY REGARDING PRODUCTS SOLD BY SELLER AND INCORPORATED INTO OTHER ITEMS MANUFACTURED OR SOLD BY BUYER, INCLUDING BUT NOT LIMITED TO ANY CLAIM OF DIRECT OR INDIRECT PATENT INFRINGEMENT.

Appendix A – How to Use the WarmMark

How to Use the WarmMark®

WarmMark is a single-use, ascending time-temperature indicator which alerts users of exposure to unacceptable temperature conditions.

Arming & Use: (WarmMark Short Run, Long Run, Duo)

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. (For WarmMark Duo, the indicator should be placed in an environment at least 5°C (9°F) below 10°C (50°F) 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 an activation threshold temperature below the ambient temperature, immediately place the indicator in the environment to be monitored to avoid 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.

WarmMark® Short Run



Threshold Temp	Run-Out Times		
	Brief	Moderate	Prolonged
-18°C / 0°F	1 hour	3 hours	12 hours
0°C / 32°F 8°C / 46°F 10°C / 50°F 20°C / 68°F	2 hours	12 hours	48 hours
5°C / 41°F 25°C / 77°F 30°C / 86°F 37°C / 99°F	30 minutes	2 hours	8 hours

WarmMark® Long Run



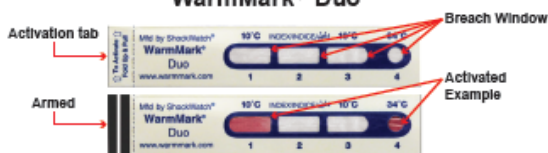
Threshold Temp	Run-Out Times				
	Line 1	Line 2	Line 3	Line 4	Line 5
10°C/50°F	12 hours	30 hours	60 hours	110 hours	168 hours
31°C/88°F	12 hours	30 hours	60 hours	110 hours	168 hours

Interpreting the WarmMark:

When the WarmMark is exposed to conditions above the indicator's activation temperature $\pm 1^\circ\text{C}$ ($\pm 2^\circ\text{F}$), a red dye will begin migrating through the run-out window(s).

Run-out times are based on a temperature 2°C (4°F) above the indicator threshold. If the temperature is greater than 2°C (4°F) above the activation temperature of the device, the run-out will occur faster.

WarmMark® Duo



Threshold Temp	Run-Out Times			
	Window 1	Window 2	Window 3	Window 4
10°C/50°F	3 days	8 days	14 days	-
34°C/93°F	-	-	-	Within 30 mins

For more information visit www.shockwatch.com or call +1.214.736.4580, toll-free 800.527.9497

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SMART SOLUTIONS FOR SAFE TRANSIT

Rev 01/2014

Appendix B – Product Safety Information: WarmMark

PRODUCT AND COMPANY IDENTIFICATION

Product Name: WarmMark®
Product Use: Elapsed time and temperature indicator
Company: ShockWatch, Inc.
510 Corporate Drive
Graham, TX 76450
Phone: +1 214-736-4580

COMPOSITION/INFORMATION ON INGREDIENTS

Proprietary, and contains no known hazardous or carcinogenic components.

Some ingredients are used in flavor/fragrance applications. Active indicator material is sealed inside the indicator construction.

HAZARDS IDENTIFICATION

There are no known hazardous ingredients or components present.

Immediate (Acute) Health Effects by Route of Entry

If indicator were torn apart, internal colored pad might have the following effects:

Skin contact - Minor skin irritation
Eye contact - Irritation or pain
Ingestion - None expected

Long-term (Chronic) Health Effects

No data available, but no known effects expected.

EMERGENCY AND FIRST AID PROCEDURES

In the unlikely event of contact with the sealed indicator material by skin or eyes, wash copiously with water for 15 minutes. For eye contact, obtain medical attention.

FIRE AND EXPLOSION HAZARD DATA

No known hazards other than normal ignition of paper and plastic by elevated temperatures.
Extinguishing media: Any of water, foam, or CO₂

ACCIDENTAL RELEASE MEASURES

Threshold limit value: None established by OSHA-ACGIH
Spill or leak procedures: Not applicable

HANDLING AND STORAGE

Stability/conditions to avoid: Excessive heat
Waste disposal: Dispose in accordance with appropriate regulations. The indicators are normally included in miscellaneous waste without special considerations.

Appendix C – Pressure-Sensitive Adhesive Data

PRODUCT DESCRIPTION

- High performance, acrylic pressure-sensitive adhesive (2 mil thick film) that provides excellent adhesion to most smooth surfaces
- Provides aggressive tack and high shear strength
- Excellent UV light stability and elevated temperature resistance

PHYSICAL PROPERTIES	TYPICAL VALUES*
Quick Tack Stainless Steel	4.0 lbs./sq.in.
Peel Adhesion Stainless Steel - 30 minute residence	4.1 lbs./in.
Shear Stainless Steel - 1000 g/sq. in. @ 72°F	300+ hours to fail
Thickness Adhesive only	0.002 inches

TEMPERATURE RANGE GUIDELINES

Application: Above 10°C/50°F for best performance

End Use: -40°C to 121°C/-40°F to 250°F

CHEMICAL RESISTANCE

Resistant to water, detergent, alcohol, aliphatic and some aromatic hydrocarbons. Not recommended for use in contact with active solvents such as ketones, esters, and some chlorinated hydrocarbons.

** Values given are typical and are not necessarily for use in specifications. Product reinforced with 2 mil PET during adhesion tests.*