



# 3M™ Freeze Watch™ Indicator

## 3M™ Freeze Watch™ Indicators

Monitoring exposure to freezing temperatures during shipping and storage.

3M™ Freeze Watch™ Indicators are ideal for temperature-sensitive products that run the risk of being damaged when exposed to freezing temperatures during shipment and storage. Examples include paint, chemicals, produce or pharmaceutical products - including vaccines, food, chemicals and medicines.

The patented design of 3M™ Freeze Watch™ Indicators consists of a highly sensitive indicating liquid inside a specially designed ampule. Freezing of the liquid causes the ampule to fracture. The liquid is released when it thaws and irreversibly stains a paper behind the ampule, providing a warning that product quality testing should be performed.

3M™ Freeze Watch™ Indicators are available at two temperature levels -4°C (25°F) and 0°C (32°F), to accommodate differing product sensitivities. Placed directly on secondary shipper boxes of temperature-sensitive products during shipment and storage, the indicators provide a reliable measure of temperature exposure.



### How to Use 3M™ Freeze Watch™ Indicators:

1. Attach the 3M™ Freeze Watch™ Indicator using the pressure sensitive adhesive on the back. Peel the release liner off the back and adhere the indicator to a clean, dry surface.
2. Before reading, the indicator should be in an area above freezing temperature for at least fifteen minutes.
3. To detect if the product has been exposed to freezing temperatures, observe the 3M™ Freeze Watch™ Indicator. If the indicator paper is stained with colour, there has been exposure.
4. If the indicator paper shows no colour indication, remove indicator from the surface to which it is attached. Vigorously tap the bottom edge of the indicator three times on a hard surface. If the paper becomes stained, your product or container was exposed to freezing temperatures. Tapping will not cause colour staining in an unexposed indicator.

### Storage:

To prevent premature indication, keep from freezing prior to use. Store in a controlled environment at 5° to 32°C (41° to 90°F), and 20 to 60% relative humidity is suggested.

### Shelf Life:

If stored at suggested conditions, shelf life for the 3M™ Freeze Watch™ Indicator is five years from date of manufacture.

The 3M Temperature Indicators monitor temperature exposure, not product quality. Their purpose is to signal when product quality should be checked.

# 3M™ MonitorMark™ Time Temperature

Providing a visual history of Time Temperature exposure.

## 3M™ MonitorMark™ Time Temperature Indicators

### Uses:

3M™ MonitorMark™ Time Temperature Indicators can be used to monitor any product subject to time temperature exposure outside the acceptable range. They are used primarily on the secondary package (case, box, etc.) and are often used to monitor storage and distribution conditions or to evaluate packaging. The indicators monitor temperature exposure, not product quality. Their purpose is to signal when product quality should be checked. Some typical applications include monitoring of drugs and vaccines, medical diagnostic kits, blood substances, food, ophthalmic solutions, and various industrial applications.

### Product Construction:

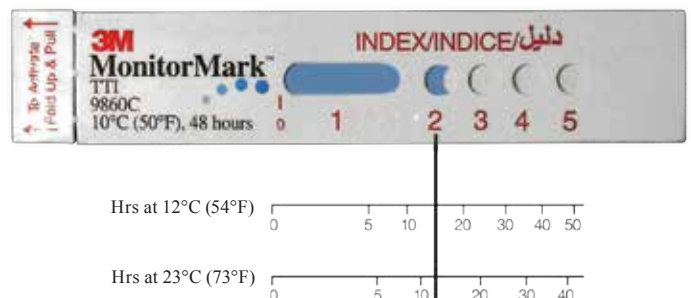
The 3M™ MonitorMark™ Time Temperature Indicator is a rectangular flat laminate containing layers of paper, film, adhesive and other components. Overall size is 95 mm x 19 mm (3 ¾" x ¾"). The heart of the indicator is a porous wick indicator track strip, one end of which is positioned over a reservoir pad containing a blue dyed specialty chemical having a desired melt point. Before activation, a removable activation strip separates the indicator track from the reservoir. A paperboard layer over these components contains viewing windows and is topped with a clear protective film over layer. A pressure-sensitive adhesive on the underside of the indicator allows convenient attachment to most clean, dry surfaces.

### Function:

After proper pre-use conditioning (see Handling and Use Guidelines), the user activates the indicator by pulling and removing the activation strip. This allows contact between the reservoir pad and the end of the porous wick indicator track. At this point, the indicator track (visible under the viewing windows) is a plain white colour. Upon exposure to temperatures exceeding the threshold response temperature, the chemical in the reservoir melts and begins to migrate along the track. Thus, blue colouring first appears at the left edge of the first viewing window and gradually moves left to right to the end of the track. The rate of the blue colour movement is dependent on the temperature.

### Runout Interpretation:

- ❖ The appearance of any blue colour in the indicator's first window signals that the indicator's preset threshold temperature has been exceeded.
- ❖ The extent of colour movement ("runout") through the indicator's windows provides an estimate of the maximum amount of time spent above the threshold temperature. A short exposure at a relatively high temperature will produce colouration comparable to a longer exposure at a lower temperature.
- ❖ The Quality Manager will use the two temperature scales on the Response Card to make decisions on product that has seen temperature exposure outside the acceptable range.



The above illustration shows how to use the runout indexes on this card to estimate the maximum amount of time a product has spent above the threshold temperature.

These indexes provide a general guideline to exposure at a constant temperature and should be used in combination with a general knowledge of the exposure conditions to estimate time/temperature exposures.





# Indicator



## 3M™ MonitorMark™ Dual Temperature Indicator

3M™ MonitorMark™ Dual Temperature Indicator incorporates both a 10°C Time Temperature Indicator and a 34°C go/no go threshold indicator whose separate window shows blue if the temperature exceeds 34°C.



## Performance:

3M™ MonitorMark™ Time Temperature Indicators will show initial colour in 24 hours or less, when exposed to the stated threshold temperature,  $\pm 1^\circ\text{C}$ . When exposed to a constant temperature  $2^\circ\text{C}$  above the threshold temperature for a time period equal to the stated cumulative runout time, the runout distance will be within  $\pm 8\%$  of the target maximum established for that indicator.

Note: Indicators are designed to run (blue colour movement) when the temperature exceeds the threshold. After this occurs, the indicators will continue to run until the temperature falls below the threshold. Typical stopping temperatures are 2-3°C below the threshold temperature.

## Storage:

- ❖ Store 3M™ MonitorMark™ Time Temperature Indicators in a controlled environment at  $22^\circ\text{C}$  ( $72^\circ\text{F}$ ) or less, and 20-60% relative humidity.
- ❖ Keep away from heating vents, hot pipes or direct sun.
- ❖ Shelf life is two years from date of manufacture.
- ❖ Packaging: 100 indicators per box, 5 boxes per case.

## Handling and Use Guidelines

### Pre-Use Conditioning:

To prevent premature response, 3M™ MonitorMark™ Time Temperature Indicators (including the Dual Temperature Indicator) must be conditioned prior to removing the activation strip and activating the indicators. This ensures that the response chemical is solid and not liquid, prior to removing the activation strip. Condition indicators at the specified temperature guidelines.

Once conditioned and ready for use, the indicators can be maintained at any temperature below their threshold temperature.

Note: It is the indicator that must be cooled to the conditioning temperatures listed above, not the product that is going to be monitored. The product needs only to be maintained below its critical temperature.



# Ordering Information:

## 3M™ Freeze Watch™ Indicators & 3M™ MonitorMark™ Time Temperature Indicators

	3M Product Number	3M Stock Number	Temperature Threshold	Runout Time	Units/Case (Minimum Order Quantity)
3M™ MonitorMark™	9860A	70-0700-7097-7	-15°C	48 hours	500
	9860B	70-0700-6804-7	5°C	48 hours	500
	9860C	70-0700-8189-1	10°C	48 hours	500
	9860D	70-0700-7243-7	10°C	168 hours	500
	9860E	70-0707-4692-3	26°C	48 hours	500
	9860H	70-0701-1995-6	31°C	168 hours	500
	9861A	70-0702-4138-8	10°C 34°C	336 hours >1 hour	500
	9864A	70-0706-0146-6	17°C	1 hour	500
	9864B*	70-0703-1208-0	31°C	72 hours	500
3M™ Freeze Watch™	9800FW	70-2007-1554-1	-4°C	N/A	400
	9805FW	70-2007-1553-3	0°C	N/A	400

\* Special order. 12 weeks lead time. Minimum order quantity 10,000 devices.

## Correct Surface Temperature During 3M™ MonitorMark™ Indicator Activation

The Time Temperature Indicator is activated by pulling the activation strip. The surface to which it is attached (carton, instruction card, product itself, etc.) must be at a temperature below the response temperature of the indicator. Otherwise, the heat from the carton or card could be enough to cause a premature response in the indicator. For example, in the case of a product being monitored with a 5°C (41°F) indicator, avoid the sequence of placing the indicator on a warm carton or instruction card, activating it, and then placing the unit in a cool place below 5°C (41°F). Rather, cool all components below 5°C (41°F) first and then activate the indicator.



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