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Warning: Keep out of reach of children, if ingested seek medical attention immediately.



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**Operating Instructions For  
Chlorine Monitor  
(Part Number: 382009)**

**Technical Summary**

**Physical Specifications:**

Dimensions	(74 ± 1 mm) x (41 ± 1 mm) x (1 mm)
Weight	1.5 g
Refrigerated shelf life	2 years
Color change	yellow to orange

**Sampling Parameters:**

Exposure dose:	
Badge	0.18 ppm-hr
Badge with color comparator	0.03 - 3.0 ppm-hr
Minimum detectable limit (8 hours)	0.023 ppm
Maximum recommended sampling time	48 hours
Minimum recommended sampling time	15 minutes
Relative humidity range	30% - 90%
Face velocity range	10 – 150 cm/sec
Temperature range	60°F - 91°F
Light effect – UV (direct sunlight)	no effect
Light effect – visible	no effect
Color stability	4 weeks

**Applications:**

The SafeAir chlorine badge may be used for personnel or area monitoring for exposure times ranging from 15 minutes to 48 hours. For higher resolution, the SafeAir chlorine badge may be used in conjunction with the SafeAir chlorine color comparator (part number: 383010).

**Cross Interferences:**

Bromine and iodine react with approximately the same sensitivity. Hydrogen chloride and hydrochloric acid at concentrations greater than 1 ppm can seriously impair the performance of the chlorine badge. No other interferences are known.

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## Introduction

Chlorine is a greenish-yellow gas with a pungent, irritating odor. Generally, chlorine is a potent respiratory system irritant. Mild exposures to chlorine cause burning of eyes, nose and mouth. Exposure to concentrations as high as 1000 ppm is likely to be fatal after a few deep breaths. The OSHA PEL for chlorine is 1 ppm (ceiling), whereas the NIOSH REL is 0.5ppm (ceiling).

Chlorine is an important chemical commodity widely used in the production of safe drinking water. It is also extensively used in the production of paper products, dyestuffs, textiles, petroleum products, chlorinated solvents, etc.

## Principle of Operation

The SafeAir chlorine badge is a monitoring system designed to indicate the presence of chlorine at concentrations below the permissible exposure limit. The SafeAir chlorine badge detects the presence of chlorine by forming a color change in the shape of an exclamation mark inside the triangle. This indication is produced by a color-forming reaction which occurs when chlorine reacts with a flat indicator layer.

## Operating Instructions

1. Remove the pouch from the refrigerator and allow it to warm to room temperature.
2. Remove the badge from its protective pouch.
3. For personnel monitoring, attach the badge near the user's breathing zone (i.e. the collar) with the front side exposed to the surrounding atmosphere.
4. For area monitoring, attach the badge to a stand and mount in a centralized area with the front side exposed to the surrounding atmosphere.
5. The exclamation mark appears within the triangle when chlorine is present. Please note that the exclamation mark will appear underneath the printed exposure dose (sensitivity).
6. To obtain the average concentration, divide the exposure dose (ppm·hr) by the exposure time in hours (hr).

## Storage

The SafeAir chlorine badge should be refrigerated in its sealed bag at all times.

## Benefits

1. Accurate Detection: The SafeAir chlorine badge is designed to react selectively with chlorine with minimum interference from other substances.
2. Applications: The SafeAir badge may be used for personnel screening and for area monitoring or area mapping.
3. Ease of Use: The SafeAir badge is a direct-read device that gives immediate, on-site results.

## Other Available Monitors

1. SafeAir Badges:

Ammonia	Dimethyl Amine	Mercury
Aniline	Formaldehyde	Nitrogen Dioxide
Aromatic Isocyanates	Hydrazine	Ozone
Carbon Dioxide	Hydrides	Phosgene
Carbon Monoxide	Hydrogen Chloride	Sulfur Dioxide
Chlorine/Chlorine Dioxide	Hydrogen Sulfide	UDMH
2. SafeAir Color Comparators:

Arsine <sup>1</sup>	Hydrogen Chloride	TDI <sup>4</sup>
Carbon Dioxide	MMH <sup>3</sup>	UDMH
Chloroformates <sup>2</sup>	Phosgene	
Diborane <sup>1</sup>	Phosgene ext. range	
Hydrazine	Phosphine <sup>1</sup>	

If you require SafeAir monitors for a chemical hazard not listed, please contact Morphix Technologies® for a free compound consultation at (800) 808-2234.

<sup>1</sup> To be used with the SafeAir hydrides badges

<sup>2</sup> To be used with the SafeAir phosgene badges

<sup>3</sup> To be used with the SafeAir hydrazine dual level badges

<sup>4</sup> To be used with the SafeAir aromatic isocyanates badges