



**Operating Instructions
Chlorine & Chlorine Dioxide Badge
(Part Number: 382003)**

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 high concentrations (e.g. 1000 ppm) is likely to be fatal. The OSHA PEL (permissible exposure limit) for chlorine is 1 ppm (ceiling), whereas the NIOSH REL (recommended exposure limit) is 0.5 ppm (TWA).

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.

Chlorine dioxide is a yellow to reddish-yellow gas with an unpleasant odor similar to chlorine and suggestive of nitric acid. Exposure may be highly irritating to the skin and mucous membranes of the respiratory tract and may cause pulmonary edema (abnormal fluid buildup in the lungs). OSHA and NIOSH exposure limit for chlorine dioxide is 0.1 ppm (TWA).

Chlorine dioxide is used in the purification of water, the tanning and detanning of leather and the bleaching of cellulose, flour, leather, fats and textiles, as well as in the paper and pulp industry.

Principle of Operation

The SafeAir chlorine & chlorine dioxide badge is a monitoring system designed to indicate the presence of chlorine and/or chlorine dioxide at concentrations below the permissible exposure limit. The SafeAir chlorine & chlorine dioxide badge detects the presence of chlorine and/or chlorine dioxide 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 the contaminant(s) react with a flat indicator layer. The SafeAir chlorine & chlorine dioxide badge is a dual-purpose badge. The color change may appear on the front if chlorine is present and/or the backside of the badge if chlorine dioxide is present depending upon the level of exposure of the two contaminants.

Physical Specifications:

Dimensions	74 mm x 41 mm x 1 mm
Weight	1.5 g
Refrigerated shelf life	1 year
Color change:	
Chlorine	yellow to orange
Chlorine Dioxide	off-white to gray

Sampling Parameters:

	Chlorine	Chlorine Dioxide
Exposure level	0.18 ppm·hr	0.2 ppm·hr
Minimum detectable limit (8 hours)	0.025 ppm	0.025 ppm
Maximum recommended sampling time	10 hours	10 hours
Minimum recommended sampling time	15 minutes	15 minutes
Relative humidity range	25% - 90%	25% - 90%
Face velocity range	10 – 150 cm/sec	10 – 150 cm/sec
Temperature range	10°C - 40°C (50°F - 104°F)	10°C - 40°C (50°F - 104°F)
Light effect – UV (direct sunlight)	no effect for 16 hr	no effect for 10 hr
Light effect – visible	no effect	no effect
Color stability	4 weeks	4 weeks

Known Interferences: **Chlorine:** bromine, iodine and hydrogen chloride.
Chlorine Dioxide: nitrogen dioxide and high concentrations of ozone

Operating Instructions

1. Allow the badge to warm to room temperature prior to removing the badge from its protective pouch.
2. Remove activation label before monitoring.
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 on the front side of the badge when chlorine is present at or above 0.18 ppm·hr. The exclamation mark appears within the triangle on the back side of the badge when chlorine dioxide is present at or above 0.2 ppm·hr.

WARRANTY EXCLUSIONS AND LIMITATION OF LIABILITY

IF THE USER DOES NOT ACCEPT THE FOLLOWING TERMS, THE USER SHOULD NOT USE THE SAFEAIR BADGES.

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



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