



Operating Instructions  
Chlorine & Chlorine Dioxide Monitor  
(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 ± 1 mm) x (41 ± 1 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:**

	<b>Chlorine</b>	<b>Chlorine Dioxide</b>
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	50°F - 104°F	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.

Seller warrants that, for the lesser of one (1) year or the shelf-life provided on the Seller's product, its packaging or its literature, its products shall conform to the description of such products as provided on the Seller's product, its packaging or its literature. THIS WARRANTY IS EXCLUSIVE AND SELLER MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Seller's warranties made in connection with this sale shall not be effective if Seller has determined, in its sole discretion, that Buyer has misused the products in any manner, has failed to use the products in accordance with safe industry standards and practices, or has failed to use the products in accordance with Seller's written operating instructions, or other instructions furnished by Seller to Buyer.

Seller's sole and exclusive liability and Buyer's exclusive remedy with respect to products to Seller's satisfaction to be defective or nonconforming shall be replacement of such products without charge or refund of the purchase price, in Seller's sole discretion, upon the return of such products in accordance with Seller's instructions. All claims must be brought within one (1) year of shipment, regardless of their nature.

SELLER SHALL NOT IN ANY EVENT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND RESULTING FROM ANY USE OR FAILURE OF THE PRODUCTS, EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE INCLUDING, WITHOUT LIMITATION, LIABILITY FOR LOSS OF USE, LOSS OF WORK IN PROGRESS, DOWN TIME, LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS, LOSS OF PRODUCTS OF BUYER OR OTHER USE OF ANY LIABILITY OF BUYER TO A THIRD PARTY ON ACCOUNT OF SUCH LOSS, OR FOR ANY LABOR OR ANY OTHER EXPENSE, DAMAGE OR LOSS OCCASIONED BY SUCH PRODUCT INCLUDING PERSONAL INJURY OR PROPERTY DAMAGE UNLESS SUCH PERSONAL INJURY OR PROPERTY DAMAGE IS CAUSED BY SELLER'S GROSS NEGLIGENCE.

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



www.morphtec.com  
©2017, Morphix Technologies  
All rights reserved  
Publication Number: 01-382003A.9-1218  
US Patent Number: 6,284,198