**Warranty Exclusions and Limitation of Liability**

IF THE USER DOES NOT ACCEPT THE FOLLOWING TERMS, THE USER SHOULD NOT USE THE CHROMAIR BADGES AND COLOR COMPARATORS.

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.

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CHROMAIR® SYSTEM

# Operating Instructions For Ammonia Monitor (Part Number: 380003)

## Technical Summary

**Physical Specifications:**

| | |
|---|---|
| Dimensions | 10.5 cm x 5.5 cm x 0.25 cm |
| Weight | 11 g |
| Refrigerated shelf life | 1 year |
| Color change | tan to black |

**Sampling Parameters:**

| | |
|---|---|
| Exposure range for: | |
| Badge | 4 - 300 ppm•hr |
| Badge used with color comparator | 3 - 600 ppm•hr |
| Maximum recommended sampling time | 16 hours |
| Minimum recommended sampling time | 5 minutes |
| Relative humidity range | 15% - 90% |
| Face velocity range | 10 - 168 cm/sec |
| Temperature range | 10ºC - 40ºC (50ºF - 104ºF) |
| Light effect - UV (direct sunlight) | not recommended |
| Light effect - visible | no effect |

**Applications:**

The ChromAir ammonia badge may be used for personnel or area monitoring for exposure times ranging from 5 minutes to 16 hours. For higher resolution, the ChromAir ammonia badge may be used in conjunction with the ChromAir ammonia color comparator (part number: 384008).

**Cross Interferences:**

Aliphatic amines react with approximately the same sensitivity. If a high concentration of sulfur dioxide exists in conjunction with ammonia, blue color appears instead of the beige and black colors, however, the performance and accuracy are not affected. No other interferences are known.

## Introduction

Ammonia is a colorless gas with a sharp, irritating odor. It is a typical respiratory and eye irritant. Depending on the concentration, it may cause burning sensations, coughing, wheezing, headaches and conjunctivitis. High exposures cause caustic skin burns, eye swelling with possible loss of vision, shortness of breath and nausea. Ammonia causes chemical pneumonitis (deep lung inflamation) and pulmonary edema (abnormal fluid build up in the lungs). OSHA exposure limit for ammonia is 50 ppm (TWA). NIOSH exposure limit for ammonia is 25 ppm (TWA).

Ammonia is a commonly used chemical. As a product of normal biodegradation of bioproducts, it is spread as a pollutant in poultry plants and animal farms. Ammonia is used in the production of nitric acid, ammonia salts, fertilizers, leather, cooling and freezing systems, cleaning liquids, etc.

## Principle of Operation

The ChromAir passive monitor is a patented direct-read autogenic exposimeter. The device is constructed from six cells attached on one side to a flat indicator layer and on the other side to a series of different diffusive resistances. Ammonia gas diffuses to the cells through the different diffusive resistances and reacts with the indicator layer, producing color change from tan to beige to black. The color produced on the indicator layer is a direct measure of the exposure dose. Visual color comparison is achieved by observing the formation of the beige threshold color on the individual cell and reading the corresponding exposure dose.

## Operating Instructions

1. Remove the pouch from refrigerator and allow it to warm to room temperature.
2. Remove the badge from its protective pouch.
3. Enter all pertinent information on the I.D. label before monitoring is started (i.e. name, location, date and start time).
4. For personnel monitoring, attach the badge near the user's breathing zone (i.e. collar) with the front side exposed to the surrounding atmosphere.
5. For area monitoring, attach the badge to a stand and mount in a centralized area with the front side exposed to the surrounding atmosphere.
6. Check the back side of the badge periodically to determine the exposure dose (ppm•hr).
7. To read the badge, locate the highest level cell with beige threshold color.
8. To obtain the average concentration (ppm) in the surrounding atmosphere, divide the exposure dose (ppm•hr) by the exposure time in hours. EXAMPLE: If the sampling time is 2 hours and the badge reads 4 ppm•hr, the average concentration is determined by:

   $\frac{4 \text{ ppm•hr}}{2 \text{ hr}}$ Therefore the average concentration is 2 ppm.

## Storage

The ChromAir ammonia monitor should be refrigerated in its sealed bag at all times.

## Benefits

1. Accurate Measurements: The ChromAir ammonia monitor is designed to react selectively with ammonia with minimum interference from other substances. The unique design of the monitor minimizes the effects of different humidities, temperatures and air velocities on the accuracy of measurements.
2. Applications: The ChromAir monitor may be used for personnel screening and for area monitoring or area mapping.
3. Ease of Use: The ChromAir monitor is a direct-read device that gives immediate, on-site results. Use of this device requires minimum training.
4. Cost Effective: The ChromAir ammonia monitor offers the user the most inexpensive air sampling solution available.

## Other Available Monitors

1. ChromAir Badges:

| | | |
|---|---|---|
| Acetone | Formaldehyde | Methanol |
| Carbon monoxide | Glutaraldehyde | Methyl ethyl ketone |
| Chlorine | Hydrogen sulfide | Methyl isobutyl ketone |
| Ethanol | Mercury | Ozone |

2. ChromAir Color Comparators:

| | |
|---|---|
| Carbon monoxide | Hydrogen sulfide |
| Chlorine | Mercury |
| Formaldehyde | |

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