



## Ammonia Gas Detection

GT3000 electrochemical gas detector applied to ammonia-gas safety

### Safety and Performance

Properly installed, reliable gas detection can help prevent ammonia-related injury.

Because ammonia is lighter than air, most ammonia gas detectors are installed in the human air interaction areas four to six feet above the floor.

It is important to remember that in high-humidity conditions, ammonia will become heavier than air.

Detectors can be installed also above potential leak sources.

Anhydrous ammonia, or ammonia ( $\text{NH}_3$ ), is a colorless gas that emits a strong odor and exists naturally in the environment. Ammonia is used commercially in the chemical industry in fertilizer and as a refrigerant. Ammonia is usually shipped as compressed liquid in steel containers.

In a controlled environment, ammonia gas is lighter than air and thus will rise and dissipate if released into the atmosphere. If the gas comes in contact with moisture or high humidity, liquefied anhydrous ammonia gas vapors become heavier than air. As the vapors spread along the ground, the risk of toxic exposure to people increases. Though ammonia's odor provides an early warning of exposure, over time the gas reduces a person's sense of smell and reduces awareness of long exposure.

Risk of exposure depends on how close a person is to an ammonia release. Most exposure is through inhalation of the vapor or gas. The vapor immediately combines with the moisture present in eyes, skin, respiratory tracts, and oral cavities. Exposure to low concentrations of ammonia in air or solution will quickly produce eye and skin irritation. Inhalation exposure to high



Figure 1. GT3000 electrochemical toxic gas detector.

concentrations of ammonia in air will cause burning of nose, throat, and respiratory tract. If ammonia is ingested through swallowing, the result is a corrosive reaction to the mouth, throat, and stomach.

Properly installed, reliable gas detection can help prevent ammonia-related injury. Because ammonia is lighter than air, most ammonia gas detectors are installed in the human air interaction areas four to six feet from the floor. Detectors can be installed above potential leak sources.

It is important to remember that in high-humidity conditions, ammonia will become heavier than air. If such conditions exist in the application, it is advantageous to mount ammonia detection above and below the potential leak point.

### Refrigeration Applications

Today's refrigeration systems include hundreds or thousands of feet of piping and large vessels containing ammonia vapor and liquid. Ammonia is an attractive refrigerant because of its efficiency. Ammonia has up to eight times more heat removal potential than other commonly used refrigerants.

In addition, ammonia as a refrigerant is attractive to food facilities because it provides

- shorter liquid lines due to high heat of vaporization,
- good heat transfer properties,
- ease of handling and environmental friendliness as it appears in nature.

Potential leak areas include the evaporators inside the cooler. Ammonia leak detectors should be placed on the valve side of these evaporators to detect potential leaks caused by corrosion, erosion, vibration, and other conditions.



Please consult a flame/gas-detection professional for assistance and additional information on the proper application of flame/gas detectors.



### Chemical Industry Applications

Manufactures, laboratories, and hospitals use ammonia in many applications: ammonia production, cleaning, and solvents.

Ammonia detectors should be installed in areas where a leak could occur or in areas where ammonia may be present. These detectors should be checked and calibrated at regular intervals to make sure alarms are properly set. In most applications, Det-Tronics recommends that the alarm set points be at or below 50 ppm.

### Ammonia Detector

The Det-Tronics GT3000 electrochemical cell detects ammonia and has a range of 0-100ppm. Its performance verified to FM6340.

The GT3000 should be installed in compressor rooms near exhaust inlets, areas prone to leaks, process areas, and roof intakes.

The GT3000 can be installed as a stand-alone device with 4-20mA output and HART protocol, local LED indicators, and magnetic calibration. As an alternative, the sensor/transmitter can be combined with a local or remote display, such as Det-Tronics FlexVu® Universal Display.

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