

Shelter-In-Place for Anhydrous Ammonia Releases

If you are advised to shelter in place, follow these instructions:



- Get inside as quickly as possible
- Turn off all heating, ventilation and air conditioning systems.
- Building superintendents should set all ventilation systems to 100 percent recirculation so that no air is drawn into the structure. Where this is not possible, ventilation systems should be turned off.
- Close and lock all doors, including garage doors to the outside and close and lock all windows (**doors and windows sometimes seal better when locked**). If there are any gaps in the weather stripping, use duct tape, plastic wrap and/or aluminum foil to seal the leaks.
- Close fireplace flues, vents and other openings
- Close as many internal doors as possible in your home or building
- Use tape and plastic food wrapping, wax paper or aluminum wrap to cover and seal bathroom exhaust fan covers, range vents, dryer vents and other openings to the outside
- Avoid open spaces in the upper levels of buildings as ammonia gas may collect in these areas. Ammonia gas is lighter than air.
- Minimize the use of elevators in buildings. These tend to "pump" outdoor air in and out of a building as they travel up and down.
- Turn on the radio or television for information. You will be advised what the hazardous material is and what the signs and symptoms of overexposure are.

Use telephones only if you need immediate emergency assistance. You will be directed how to seek medical help outside the evacuation area.

If the ammonia smell starts to bother you,

- Hold a wet cloth or handkerchief over your nose and mouth. For a higher degree of protection, go into the bathroom, close the door and turn on the shower in a strong spray to "wash" the air (**refer to article below**). Seal any openings to the outside of the bathroom as best you can. Do not worry about running out of air to breathe since this is highly unlikely in an average home or building.

The following information is provided from the Journal of Occupational and Environmental Hygiene:

Shelter-in-place strategies such as remaining indoors; breathing through a damp cloth; sealing cracks in windows and doors using towels, duct tape, or plastic sheeting; and running a shower are often recommended by emergency response officials to protect against accidental or intentional release of hazardous airborne chemicals and biologicals. Similar recommendations have been made to and used by community members exposed to anhydrous ammonia after catastrophic release of ammonia gas due to a derailment or other accidents. Such incidents have resulted in fatalities and serious injury to exposed individuals; however, other individuals within the same area have escaped injury and, in many cases, sustained no injuries as a result of sheltering-in-place. Although there are some studies that have evaluated the effectiveness of remaining in the home or breathing through a damp cloth to reduce exposure to various agents, there have been no studies that directly address the efficacy of running the shower in reducing exposure to ammonia gas. The present study was designed to simulate sheltering-in-place inside a typical bathroom with the shower running. The effectiveness of breathing through a damp cloth was also evaluated using a CPR mannequin placed inside a chamber built to represent a typical household bathroom. Ammonia gas at 300 or 1000 ppm was added to the chamber until the concentration peaked and stabilized, then the shower was turned on and the ammonia gas concentration was continuously monitored. In the mannequin studies, using a damp cloth reduced exposure to ammonia gas by 2- to 18-fold. Turning on the shower was even more effective at reducing ammonia levels. After 27 min, the ammonia concentration in the chamber was reduced to 2% of the initial concentration, even though gas was being continuously added to the chamber. These results indicate that use of shelter-in-place strategies substantially reduces ammonia exposure and that by combining shelter-in-place strategies, inhalation of ammonia gas can be reduced 100-fold even during prolonged exposure periods.

Tarkington, B., Harris, A. J., Barton, P. S., Chandler, B., & Goad, P. T. (2009). Effectiveness of Common Shelter-in-Place Techniques in Reducing Ammonia Exposure Following Accidental Release. *Journal of Occupational and Environmental Hygiene*, 6(4), 248–255. <https://doi.org/10.1080/15459620902746857>