

Preventing Ammonia Burns and How to Treat Them¹

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Anhydrous ammonia is one of the most efficient sources of nitrogen fertilizer and is popular among Michigan growers because of its relatively low price. With proper precautions, it is safe to handle, but the number of accidents related to anhydrous ammonia in the United States has increased in recent years. These increases are due, in part, to older transport and application equipment becoming timeworn.

Safety devices built into anhydrous ammonia application equipment are designed to protect against a major ammonia release, but equipment failures have been reported. Operators and anyone in the area are at risk for severe burns.

The biggest risk associated with anhydrous ammonia handling is an accidental release of NH₃. Inside the tank, ammonia under pressure remains in a liquid form that maintains a temperature of -28° F. Once released, whether into the soil or the air, it immediately becomes a vapor that seeks out the most available source of moisture. Unfortunately, this moisture source may be the body of the operator, which is composed of 90 percent water. When a human body is exposed to anhydrous ammonia the chemical freeze burns its way into the skin, eyes or lungs.

Unlike wounds from a fire which tend to sear the flesh, ammonia consumes six times its own weight in moisture from any body tissue available. The only treatment is water, lots of water, and then more water. Flushing the burn with water gives the ammonia an

easier source of moisture to seek out, pulling it away from human tissue. The best advice to ensure the safety of the operator is to make sure the equipment is in sound operating condition and, in the event of an accident, take every precaution to protect against a serious injury by wearing basic personal protective equipment (PPE).

OPERATOR PROTECTION

Most injuries occur when anhydrous ammonia is transferred from one tank to another. It is during this task that operators frequently forget to take the proper safeguards to reduce the risk of injuries from ruptured hoses, valve or coupler failures, or any host of problems that can happen in a split second. Without proper protection, the operator is defenseless. Skin burns are the most common injuries reported from accidental exposure to anhydrous ammonia, but eye injuries are the most serious. To protect the eyes, wear goggles specifically designed for handling anhydrous ammonia. There are several brands available on the market that offer the protection needed in the event of an accident. Don't rely on eye- or sun-glasses to protect your eyes, the open area between the eye and the frames allow anhydrous ammonia to come in contact with the skin and eye tissue. Recommended goggles are non-vented to keep NH₃ vapors from the eyes. These goggles fit tight but allow for wearing of eyeglasses.

Loose fitting rubber gloves designed for anhydrous ammonia will protect the hands from thermal freeze burns. Turn the cuffs of the gloves out so liquid

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ammonia doesn't run down your sleeve. Also, wear a heavy, long-sleeved workshirt to keep the chemical from reaching the skin. Long pants with the cuffs outside the boots are necessary for protection of the lower body.

University research shows that in 80 percent of the accidents involving anhydrous ammonia, 80 percent of the workers had access to gloves, but only 29 percent were wearing them. Likewise, 60 percent had goggles, but only 22 percent were wearing them.

WATER, WATER AND MORE WATER

Two or more sources of water are recommended in case of an accident. State law requires that all anhydrous transport and application equipment carry a 5-gallon container for fresh water. This water must be changed daily because anhydrous fumes that escape the nurse tank will contaminate this water supply.

A small squeeze bottle filled with clear water can be kept in your shirt pocket. This bottle will readily be available for flushing anhydrous ammonia from your eyes or for rinsing small exposures to the skin.

A third water container, carried on the tractor, is a readily accessible source of water for any accident. It becomes extremely important if an ammonia leak prevents the operator from getting to the water tank on the nurse tank.

If ammonia gets on your skin or in your eyes, flush the areas with clear water for at least 15 minutes to rinse away all ammonia. If water is not available, cool coffee, milk, cola, juice or other nontoxic liquid may provide temporary help. An ammonia blast to the face could freeze eye lids closed. Never force eye lids open with your fingers, instead, apply water to the lids and continue flushing until they open. When ammonia is sprayed on your clothes, flush the clothing with water for a few moments until it is thawed, then remove the clothing and continue to rinse the skin for at least 15 minutes.

Always seek medical attention after an exposure to anhydrous ammonia. Proper medical treatment will reduce the severity of the injury and speed the recovery process. Never apply salves or ointment to ammonia burns. Your physician will advise you on the proper treatment of anhydrous ammonia burns.