

Respiratory Protection Needed for Many Farm Jobs¹

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Michigan farmers frequently work in areas laden with dust, molds and toxic gases that can damage their respiratory systems. Without proper protection, these farmers run the risk of developing a chronic illness that can rob them of their ability to work and enjoy life. In certain situations, such as in recently filled silos or in manure pits, even a brief exposure to the toxic gases can kill the unsuspecting farmer.

Matching the respiratory protective device with the situation is as important as selecting the right tool for the job. No farmer would attempt an engine overhaul with an adjustable wrench and pliers, so don't count on a red bandanna tied around your mouth and nose to protect you when the situation requires a self-contained breathing apparatus similar to those worn by firefighters.

DISPOSABLE RESPIRATOR MASKS

These types of dust respirator masks are designed to filter nuisance dust and mold spores. Certain types of disposable dust masks contain activated charcoal that remove some troublesome livestock odors, organic vapors, mists that do not contain harmful vapors, welding fumes and paint spray particles. A less expensive type of mask, a particle mask, is only good for filtering out common nuisance dusts, but provides no protection from molds. None of these types of masks are capable of removing ammonia gas or pesticide vapors.

The cost of these types of masks ranges from less than 25 cents to \$6 each. There are disposable respirators available for pesticides, anhydrous ammonia, and livestock

ammonia available in the \$20 price range. These masks do not provide protection from fumigants.

Farmers can ensure that they are getting a respirator that will provide the required protection by reading the label which explains what type of particulates or vapors the masks are capable of removing.

CARTRIDGE RESPIRATOR SYSTEMS

Available in half-mask or full facepiece models, cartridge respirators are capable of providing the farmer protection from a wide-range of agricultural respiratory hazards. The full facepiece models provide eye protection when there is a risk of chemical burning or liquid splashing into the eyes.

Available in prices ranging from \$30 to \$100, cartridge-type respirators are capable of providing protection from anhydrous and livestock ammonia, pesticides (but not fumigants), disinfectants, dusts, molds, welding fumes, and acid and organic vapors.

Farmers need to be aware that the cartridge respirator system is designed to filter out particulates and certain odors, they are not an air supply for oxygen deficient areas such as in sealed silos and manure pits, or in silos where silo gas is suspected.

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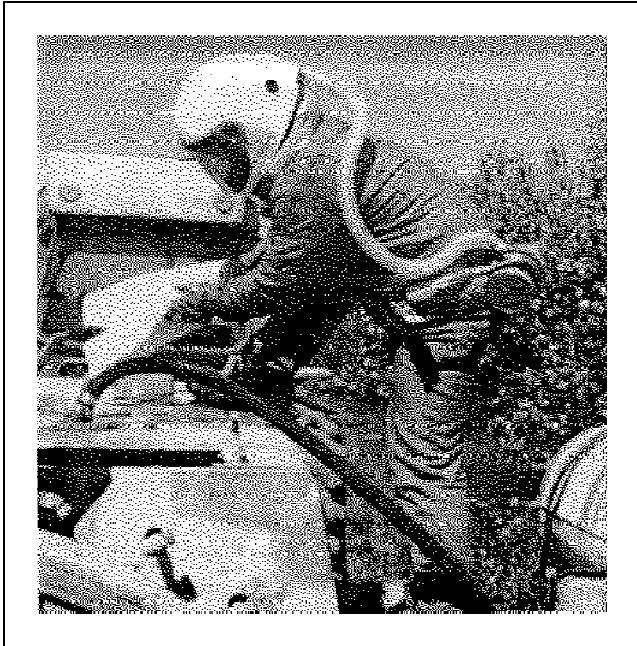


Figure 1. A powered air-purifying helmet provides protection for the wearer's face and respiratory system.

HELMET DESIGN

Air-purifying helmets are available for farmers who are seeking respiratory protection from dusts, pesticides and anhydrous ammonia. The helmet also provides protection for the entire head (see Figure 1). These air-pressurized helmets are equipped with a visor and a drawstring collar to eliminate contaminated air from entering under the helmet. A battery driven air pump filters incoming air and pressurizes the entire helmet.

Helmets are equipped with a rechargeable battery pack that can be plugged into the tractor's electrical system for extended wear. The battery pack provides air flow for up to four hours so the farmer can leave the tractor to load or repair equipment.

The cost of an air-purifying helmet is about \$700. Cartridge filters, which last about 100 hours and cost \$30 to \$45 per set, are available for pesticide and ammonia applications. The helmet does not provide oxygen to the wearer, it only filters out certain gases and particulates. The unit is not to be used in oxygen deficient areas such as sealed silos and manure pits, nor should it be used when applying fumigants.

SCBA

The self-contained breathing apparatus (SCBA) is a farmer's only protection when working with fumigants, or in manure pits, sealed silos and other areas where oxygen is limited or where toxic gases are suspected (see Figure 2). This type of unit, similar to that worn by firefighters, provides the farmer with breathable air for about 30 minutes.

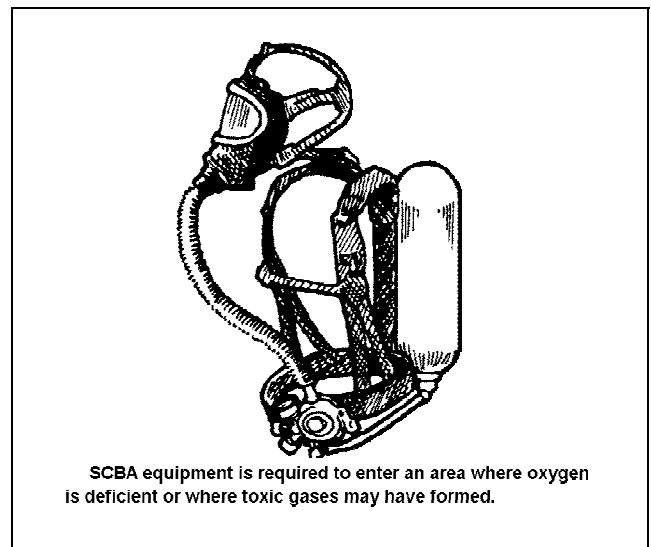
The cost of the unit is about \$1,600 and weighs about 45 pounds. The user also needs to be instructed in proper use of the unit.

FILTERS AND CARTRIDGE

There are two basic types of elements for purifying air, mechanical filters and chemical cartridges. Both are frequently used in combination, with the filter element first screening out particulates and the chemical cartridge filtering gases and vapors.

Chemical Cartridge Elements

Chemical cartridges are filled with a specially treated activated carbon that has a high absorption capacity to certain gases and vapors. As gases and vapors pass through the element they become trapped on the carbon element, stopping them from entering the mask. The absorption capacity of the cartridge is limited, so the wearer should replace the cartridge when any taste, odor or irritation is noticed.



SCBA equipment is required to enter an area where oxygen is deficient or where toxic gases may have formed.

Figure 2.

Mechanical Filter Elements

The mechanical filter protects the wearer from dusts and mists by trapping the particulates in the fibrous material of the mask. They become more efficient as the mask is worn, but the filter element must be replaced as it becomes more difficult to breath through.

FITTING THE RESPIRATOR

Beards and the physical size of the individual's face may make fitting a respirator difficult or impossible. Beards interfere with the seal of mask-type respirators and half and full-face respirators. Farmers with facial hair should consider an air-purifying helmet, which can accommodate most beards.

Banana oil ampules are available to test the fit of a respirator before entering an area with contaminated air. To test for proper fit, crush the ampules after installing the respirator, if any odor is detected then adjustments must be made to the respirator or new cartridges are needed.

MEDICAL CONCERNS

Check with your physician prior to using any respirator or self contained breathing apparatus to be sure any pre-existing medical condition(s) would not be further irritated by using a respirator or other air-purifying device.