Respiratory Protective Devices for Pesticides

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Toxic chemicals can enter the body in three ways: 1) by swallowing, 2) by breathing, and 3) by absorption through the skin. Of these three avenues of entry, the respiratory (breathing) system is the quickest and most direct route to the circulatory system. Many toxic substances are able to move through cell membranes and enter the blood capillaries of the lungs. From this point, toxicants can be transported rapidly throughout the body.

Respiratory protective devices vary in design, use, and protective capability. In selecting a respiratory protective device, the user must first consider the degree of hazard associated with breathing the toxic substance and understand the specific uses and limitations of available equipment. Be sure to select a respirator that is designed for the intended use. An applicator may need different respirators for different chemicals or groups of chemicals. Where possible, select only equipment approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mining Enforcement and Safety administration (MESA). Look for the NIOSH approval numbers beginning with the letters TC.

Respiratory protective devices can be categorized into three classes: air-purifying; supplied-air; and self-contained breathing equipment. Since most pesticide contaminants can be removed from the atmosphere by air-purifying devices, we will look at these in greater detail.

Air-purifying devices can be used only in atmospheres containing sufficient oxygen to sustain life (at least 19.5% oxygen by volume). Chemical cartridge respirators provide respiratory protection against certain gases and vapors in concentrations not greater than 0.1% by volume.

Mechanical filter respirators (dust masks) provide respiratory protection against particulate matter, such as nonvolatile dusts, mists, smokes, and metal fumes. Many respiratory protective devices are combinations of chemical cartridge and mechanical filter respirators and thus provide respiratory protection against both gases and particulate matter.

Gas masks are examples of air-purifying devices that provide respiratory protection against particulate matter and against certain specific gases and vapors in concentrations up to 2% by volume, provided that...
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this volume does not exceed a concentration that is immediately dangerous to life and health.

Chemical cartridge respirators protect against light concentrations of certain organic vapors, such as acetone, alcohol, carbon tetrachloride, and gasoline; acid gases, such as chlorine and sulfur dioxide; and other gaseous materials, such as ammonia and mercury vapor. Chemical cartridge respirators use various chemical filters to purify inhaled air, whereas mechanical filter respirators afford protection against only airborne particulate matter. These chemical filtering units are usually called cartridges (or canisters with gas masks). Different chemical cartridges or canisters must be used for different contaminants. Cartridges and canisters that protect against certain organic vapors differ chemically from those that protect against ammonia fumes. **Be sure that the cartridge or canister is approved for the pesticide you intend to use.** Do not use chemical cartridge respirators for protection against extremely toxic gaseous material, such as hydrogen cyanide, methyl bromide, or other fumigants. Special fumigant masks are available from a number of manufacturers.

**Use and Care of Respirators**

Chemical cartridge respirators are designed to cover the nose and mouth, whereas gas masks give total protection of the face. Use respirators as needed for protection from dusts, mists, smokes, and certain vapors when handling pesticides. Follow these precautions when using respirators:

- **READ THE LABEL** on the pesticide containers.
- **READ THE LABEL** on the cartridge or canister. Be sure the chemical filter will provide protection against the pesticide you intend to use.
- Make sure all valves, mechanical filters, and chemical filters (cartridges or canisters) are properly positioned and sealed.
- Fit the respirator on your face to ensure a tight but comfortable seal.
- Test for air leakage by placing your hand over the outside exhaust valve. Exhale to cause slight pressure inside the facepiece. If air escapes, readjust the headbands until a tight seal is obtained.
- Change filters whenever any leakage is detected by smell; taste; irritation to eyes, nose, throat; or when breathing becomes difficult. If nausea, dizziness, or signs of distress develop, get to fresh air immediately.
- Make it a fundamental safety rule to never use a cartridge for more than 8 hours.
- After each use of the respirator, remove all mechanical and chemical filters, and wash the mask with soap and warm water. Rinse thoroughly with clean water to remove all traces of soap. Wipe with a clean cloth and allow to air-dry in a clean and well-ventilated area.
- Store the respirator mask, cartridges, canisters, and mechanical filters in a clean, dry place, preferably in a tightly sealed plastic bag.

**Pesticide Respirators**

The following approved devices are available for protection against pesticide contaminants.

**Chemical Cartridge Respirators**

- MSA number 460968 respirator with a 464025 cartridge. Approval number TC-23C-79. Mine Safety Appliances Co.
- Pulmosan number C-241 respirator with a 17160 organic vapor cartridge and a C-241-7 particulate filter. Approval number TC-23C-110. Pulmosan Safety Equipment Corp.
- HSC Model 1482-G100-F104 respirator with a G100 organic vapor cartridge and an F104 prefilter. Approval Number TC-23C-202. H.S. Cover Co.
- Norton Co. SPD, 7549 respirator with dual 7500-21 cartridges. Approval number TC-23C-74. Norton Co. SPD.

Archival copy: for current recommendations see [http://edis.ifas.ufl.edu](http://edis.ifas.ufl.edu) or your local extension office.
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- AO number R5058 or R6058 respirator with R58 cartridges. Approval number TC-23C-106. American Optical Safety Products.

- Willson ATX2 or 122115 respirator with R21 cartridges and R15 filters. Approval number TC-23C-54. Inco Safety Products Co.


- Scott Aviation number 64-OVP half-facepiece respirator with 642-OV cartridges and 642-F particulate filters. Approval number TC-23C-117. Scott Aviation, a Division of A-T-O Inc.

- Scott Aviation number 65-OVP full-facepiece respirator with 642-OV cartridges and 642-F particulate filters. Approval number TC-23C-224. Scott Aviation, a Division of A-T-O Inc.

Gas Masks

- MSA Chin Style Pesticide Mask, number 448983 or 448984 (in case) with 448972 canister. Approval number TC-14G-86. Mine Safety Appliances Co.


Powered Air-Purifying Pesticide System

3M Co. W-262, W-263, or W-264 pesticide system with replaceable prefilter pad (W-2032), replaceable high-efficiency filter (W-2031), and replaceable chemical adsorption cartridge (W-2114). Approval number TC-23C-78. 3M Co.

Fumigant Masks

- MSA Mask, number 457069, for phosphine, organic vapors, and hydrogen sulfide, with two 77713 GMC-SS-1 canisters.

- MSA Mask, number 448934, for organic vapors like methyl bromide, with GMA 449888 canister. Approval number TC-14G-97.