Pesticide safety information may change over time. This information is provided for educational purposes only and was published in 2019.

Although pesticides can be an essential tool in pest management, the improper use and disposal of these chemicals poses a continuing risk to humans, animals, and the environment. It is important for applicators to understand that pesticide safety is not only about protecting ourselves—it’s also about protecting our domestic and wild animals, environment, landscapes, and our communities.

Misuse of pesticides can lead to serious injury, illness, or death. Cooperative Extension does not guarantee the safety or effectiveness of any product or practice. Users of any pesticides and Extension’s educational materials do so at their own risk and assume all risk from using such pesticides and materials, whether they follow recommendations or not. The user bears all responsibility for resulting damage to property, human health, or the environment. Cooperative Extension and the University of Maine System shall not be responsible for any damages including, but not limited to, ANY AND ALL DAMAGE OR LOSS TO REAL OR PERSONAL PROPERTY, PERSONAL INJURY OR DEATH, RESULTING FROM THE NEGLIGENCE OF COOPERATIVE EXTENSION, THE UNIVERSITY, ITS TRUSTEES, FACULTY, AGENTS, EMPLOYEES OR VOLUNTEERS.

Always follow directions on pesticide labels! Failure to do so violates federal law. Application timing and proper calibration are as important as using the right product.

Cooperative Extension makes no warranty or guarantee of any kind, expressed or implied, concerning the use of any stated products. Trade names are used for identification only. No product endorsement is implied, nor is discrimination intended.

The University of Maine is a EEO/AA employer, and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, including transgender status and gender expression, national origin, citizenship status, age, disability, genetic information, or veteran status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding nondiscrimination policies: Sarah E. Harebo, Director of Equal Opportunity, 207 North Stevens Hall, University of Maine, Orono, ME, 04469, 207.581.1240, eooinfo@maine.edu.

This material is meant as a general guide only. Always follow pesticide label and respirator manufacturer instructions. For more information on respirators and their use, see:

- NOISH/CDC—cdc.gov/noish, cdcinfo@cdc.gov, 800.232.4636,
- OSHA—osha.gov, 800.321.6742,
- EPA—epa.gov/pesticides, pesticidequestions@epa.gov,
- PERC—pesticidesresources.org,
- AgriSafe Network—agrisafe.orgsuffs-for-life,
- Maine BPC—thinkfirstspraylast.org, 207.287.2731,
- UMaine Cooperative Extension professionals—Jason Lilley, jason.lilley@maine.edu, 207.781.6099, or Kerry Bernard, kerry.bernard@maine.edu, 207.581.3884

## The Right Respirator

**Respirators and Pesticides I**

Inhalated pesticides can damage the respiratory tract and may pass into the bloodstream within moments. The consequences range from minor nose and throat irritation to permanent disability, neurological damage, or death.

Not only is it a health risk, but when the pesticide label directs you to wear a respirator, it’s illegal to do otherwise. Not all respirators are suitable for all pesticides, users, or pesticide situations, however, and selecting one is far from straightforward. The codes used to identify the different respirator types and components can be confusing. Worse, some pesticide labels still use outdated respirator language.

The following graphics and descriptions should help demystify respirator terminology and classification.

### Cartridge Colors

<table>
<thead>
<tr>
<th>NOISH prefix</th>
<th>Type(s) of respirator</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-84A</td>
<td>Filtering facepieces</td>
<td>Non-powered respirators (standard high-efficiency particulate respirators) with a particulate filter or combination filter.</td>
</tr>
<tr>
<td>TC-23C</td>
<td>Non-powered respirators without a chemical cartridge</td>
<td>Powered chemical respirators without a particulate filter or combination filter.</td>
</tr>
<tr>
<td>TC-14G</td>
<td>Gas mask</td>
<td>Powered chemical respirators without any chemical cartridge.</td>
</tr>
<tr>
<td>TC-19C</td>
<td>Supplied-air respirators (SARs)</td>
<td>Airliner respirator setups in which no escape tank is carried above their own prefix.</td>
</tr>
</tbody>
</table>

Only respirators with a TC prefix have been tested and certified by the National Institute of Occupational Health and Safety (NIOSH) and approved for use with pesticides.
Respirators

Atmosphere filters protect against two or more (not at once) the type of chemical they protect against. No cartridge or canisters can do this, but the sorbents and/or catalysts in cartridges and canisters become saturated too quickly. If a cartridge requires an N, R, or P class filter, but an adjacent or another, oil-based cartridge has been added to the mix tank, use an R or P class filter.

Gases and Vapors

Some pesticides are gases, or give off gases at ambient temperatures (vapors). Filters do not protect against these, but the sorbents and/or catalysts in cartridges and canisters can. Cartridges/canisters are color-coded by the type of chemical they protect against. No cartridge or canister can absorb every type of gas or vapor, but some are designed to protect against two or more (not at once).

<table>
<thead>
<tr>
<th>Type</th>
<th>NIOSH Approval</th>
<th>Facepiece</th>
<th>Fit</th>
<th>Reusable</th>
<th>Protects against Particulates</th>
<th>Oil Resistant</th>
<th>Protects against Oxygen</th>
<th>Protects against Fumigants</th>
<th>For Use in IDLH Environments</th>
<th>Requires Fit Test</th>
<th>Offers Respiratory Protection</th>
<th>Can Be Worn with Facial Hair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-contained Breathing Apparatus (SCBA)</td>
<td>TC-13F</td>
<td>Hood/helmet</td>
<td>Loose</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Supplied-air Respirator (SAR)</td>
<td>TC-19C</td>
<td>Hood/helmet</td>
<td>Loose</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>NO</td>
</tr>
<tr>
<td>Gas Mask</td>
<td>TC-14G</td>
<td>Elastomeric</td>
<td>Tight</td>
<td>Yes</td>
<td>With combo canister</td>
<td>With P100 canister</td>
<td>With OV canister</td>
<td>Some, at very low levels</td>
<td>Emergency escape only</td>
<td>YES</td>
<td>Yes</td>
<td>NO</td>
</tr>
<tr>
<td>Chemical Cartridge Respirators (CCS)</td>
<td>TC-23C</td>
<td>Powered hood/helmet</td>
<td>Loose</td>
<td>Yes</td>
<td>With HE filter</td>
<td>With HE filter</td>
<td>With OV cartridges</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>If full-mask</td>
<td>NO</td>
</tr>
<tr>
<td>Powered Particulate Respirators</td>
<td>TC-21C</td>
<td>Hood/helmet</td>
<td>Loose</td>
<td>Yes</td>
<td>Yes, HE filters</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>Yes</td>
<td>Yes</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>Non-powered Particulate Respirators</td>
<td>TC-84A</td>
<td>Elastomeric</td>
<td>Tight</td>
<td>Yes</td>
<td>With R or P rating</td>
<td>With OV combo cartridges</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>If full-mask</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

Purifying Respirators (APRs)

Air-purifying respirators mechanically filter out particulate contaminants and/or adsorb gases and vapors as the air is drawn through filters, cartridges, or a canister. They cannot be used in oxygen-deficient atmospheres.

Filtering facepieces are disposable particulate APRs in which the entire facepiece serves as a filter. Though not elastomeric, they must be tight-fitting with a proper seal. As non-powered particulate APRs, they get the TC-84A NIOSH designation.

Nuisance Dust Masks

Though they are整治ly resemble filtering facepieces, nuisance dust masks are not respirators, are not NIOSH approved, and cannot provide adequate protection from pesticides. They only protect against nuisance levels of non-toxic particles.

Reusable non-powered chemical cartridge and particulate APRs are tight-fitting respirators equipped with cartridges of activated carbon that adsorb gases and vapors, filters that mechanically prevent particulates from entering the facepiece, or combination cartridges with the components of both. NIOSH designates all non-powered respirators with only chemical cartridges as TC-23C and ALL non-powered respirators and cartridges with particulate protection as TC-84A. Since most pesticides for which respirators are used require some particulate protection, TC-84A respirators are more common. The facepieces for either can be half- or full-mask.

Powered-air-purifying respirators (PAPRs) force air through a filter and/or cartridge for the user, making it less strenuous to breathe than when wearing other APRs. They’re commonly outfitted with a loose-fitting helmet or hood instead of an elastomeric facepiece. This allows individuals who are unable to get a proper seal with tight-fitting respirators, or those with certain physical limitations, to use them. PAPRs are classified differently by NIOSH, depending upon whether they protect against gases and vapors (TC-23C) or particulates alone (TC-21C). TC-21C PAPRs are equipped with a high efficiency (HE) filter. TC-23C PAPRs have either a chemical cartridge or combination cartridge with both HE filter and chemical sorbent. PAPRs are typically much more expensive than non-powered APRs, but may be the only option for some individuals, including those with beards.

Gas masks are non-powered, elastomeric APRs that take a canister. With the proper canister, they protect from both pesticide particulates and vapors. Gas masks are more effective for longer than other non-powered APRs. Some fumigant labels allow their use at known, low-level chemical concentrations. They can be used to escape from IDLH (Immediately Dangerous to Life and Health) atmospheres in emergency situations, but the canisters become saturated too quickly under these conditions to be used in place of atmosphere-supplying respirators.

Atmosphere-Supplying Respirators

Atmosphere-supplying respirators must be used when the air is oxygen deficient or too contaminated to safely filter/decontaminate. They provide clean, oxygenated-