

PPE Considerations When Using Electrostatic Sprayers to Apply Disinfectants

Description

When antimicrobial claims are desired for a formulated chemical product, such as for marketing as a surface disinfectant or sanitizer, the product is regulated as a pesticide under the Environmental Protection Agency (EPA) Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). EPA's regulatory process ensures that all registered disinfectant products legally sold in the United States include directions for use which, if followed, will allow a product to carry out its intended function without resulting in unreasonable adverse effects on the environment. Note the EPA Label may also contain precautionary information including PPE, like respiratory protection, and will always state "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." Any time you use an EPA-registered disinfectant, you should read the product label and follow the directions, including the method of application.

Recently, there has been increased interest in the application of antimicrobial disinfectants via electrostatic sprayers given the need to disinfect large indoor spaces to reduce the risk of exposure to the virus that causes COVID-19. According to the EPA "Unless the pesticide product label specifically includes disinfection directions for fogging, fumigation, wide-area or electrostatic spraying, or application via drones (i.e., unmanned aerial vehicles (UAV)), EPA does not recommend using these methods to apply disinfectants. EPA has not evaluated the product's safety and efficacy for methods not addressed on the label." Because the EPA is expediting disinfectant manufacturer applications to add directions for indoor use with electrostatic sprayers to products intended to kill SARS-CoV-2 (COVID-19), it is anticipated that the number of disinfectants listing this application method on their label will increase.

As part of this expedited review process, the EPA has indicated that amendments to the disinfectant product label including electrostatic spray application should include the following personal protective equipment (PPE) statements as part of the electrostatic spray directions for use:

- For chemicals that have low vapor pressures (less than $1. \times 10^{-4}$ mm Hg), use N95 filtering facepiece respirators or half face respirators with N95 filters.
- For high vapor pressure chemicals (greater than $1. \times 10^{-4}$ mm Hg), such as hydrogen peroxide, use half face respirators with chemical specific cartridges and N95 filters.
- Other personal protective equipment including gloves, clothing and eye protection is applicable as specified on the approved product label consistent with the acute toxicity profile of the product.

The following additional PPE considerations are intended to assist employers with their risk assessments when using disinfectants and sanitizers.

Under the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (see 29 CFR 1910.1200) workers are expected to have access to hazard information, such as safety data sheets (SDS) and labels, in addition to training on how to protect themselves. While the precautionary information provided in the SDS can be used as general recommendations, the employer is expected to conduct a workplace-specific assessment to manage the risk of hazardous chemical handling, and document that assessment by certification to determine appropriate PPE for worker tasks where hazards exist (see 29 CFR 1910.132). In addition, the OSHA Respiratory Protection Standard (see 29 CFR 1910.134) applies

if respirators are worn in the workplace (see the [3M Administrative Respiratory Program Brochure](#) for more information on this Standard).

Under the Respiratory Protection Standard, OSHA requires employers to develop and implement a written respiratory protection program that includes the procedures and elements for respirator use at their specific workplace. The written program must include all the elements required by OSHA including the following:

- Procedures for selecting respirators for use in the workplace
- Medical evaluations of employees required to use respirators
- Fit testing procedures for tight fitting respirators
- Procedures for proper use of respirators
- Procedures for cleaning, disinfecting, storing, inspecting, repairing, discarding and otherwise maintaining respirators
- Training of employees

It is the employer's responsibility to determine what specific applications require the use of respiratory protective equipment. Respirator selection is based upon the physical and chemical properties of the air contaminants and the concentration level to be encountered by the employee. Employers should designate a program administrator to oversee the respiratory protection program. The program administrator should be qualified by appropriate training or experience that is commensurate with the complexity of the program.

Respirator Selection Tips



The OSHA Respiratory Protection Standard requires employers to identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form (see 29 CFR 1910.134(d)(1)(iii)). This process is generally called exposure assessment and is an important part of understanding the risk to employees from airborne contaminants. Understanding the chemical contaminants in the air a worker is breathing is a main goal for employers in evaluating inhalation exposure. Sometimes that is done by professional judgment, where a specially trained person like a Certified Industrial Hygienist (CIH) may estimate exposure. Often a more quantitative exposure assessment is needed, and air sampling is then conducted, with results compared to an Occupational Exposure Limit (OEL).

An OEL is the amount of a substance to which the limit's publisher believes a worker can be exposed, day after day, for a working lifetime, without adverse health effects. Exposure limits vary from one substance to another based on the toxicity of the substance. Worker exposure limits can come from a variety of sources and be expressed in a variety of ways. Some OELs are regulatory limits, such as the US OSHA PELs or Permissible Exposure Limits. Others are developed by non-governmental entities and, while they may not always be legally enforceable, they are followed and recognized in many workplaces when lower than the PEL. The American Conference of Governmental Industrial Hygienists or ACGIH threshold limit value (TLV®) is probably the most well-known of these.

The exposure assessment process is important for selecting a respirator adequate to protect the health of the employee and in compliance with OSHA and other applicable regulatory requirements. Under OSHA, employers must understand any applicable regulations relevant to their operations, such as use of the Assigned Protection Factor Table in the Respiratory Protection Standard to assign a respirator that meets or exceeds the required level of employee protection (see Table One at 29 CFR 1910.134(d)(3)(i)(A)). The respirator selected must also be appropriate for the chemical state and physical form of the contaminant, such as gas, vapor, or particulate. Additional details on respirator selection can be found in the National Institute for Occupational Safety and Health (NIOSH) Respirator Selection Logic, including particulate filter classifications such as N95 and higher. Understanding the different types of particulate filters and gas and vapor cartridges can help you select the right one. See more on respirator selection at

http://www.3m.com/3M/en_US/safety-centers-of-expertise-us/respiratory-protection/respirator-selection

Examples of Respirator Facepiece Types listed in EPA Electrostatic Spray Expedited Review Process*

Filtering Facepiece Respirator	Half-Facepiece Respirator
Assigned Protection Factor (APF) = 10	Assigned Protection Factor (APF) = 10
	

Examples of Respirator Types with Higher Assigned Protection Factors (APF)*

Full-Facepiece Respirator	Powered Air Purifying Respirator (PAPR)
Assigned Protection Factor (APF) = 50**	Assigned Protection Factor (APF) = 25-1000***
	

*Note that respirators other than filtering facepiece must also be used with an appropriate filter and chemical cartridge, including changeout schedule, where indicated. See the 3M Respirator Selection and Service Life Software for assistance in determining filter and cartridge selection and calculating cartridge changeout schedules at <http://www.3m.com/sls>, or the 3M Technical Data Bulletin [Respiratory Protection for Hydrogen Peroxide, Peracetic Acid and Acetic Acid](#).

**When quantitatively fit-tested.

***Depending on headgear selection and contaminant type.

Respiratory Protection Product example for EPA Label statement:



Other potential respiratory protection products depending on exposure and risk assessment:



Examples of Respiratory Protection for Select Disinfectant Products applied with Electrostatic Sprayers

- Ecolab Peroxide Multi Surface Cleaner and Disinfectant concentrate EPA Reg. No. 1677-238
 - EPA Label Statement for Electrostatic Spray Application – Use half face respirator with chemical specific cartridge and N95 filters
 - Ingredient Information from SDS for product at use dilution – 0.375% hydrogen peroxide
- Diversey Oxivir TB EPA Reg. No. 70627-56
 - EPA Label Statement for Electrostatic Spray Application – Use half face respirator with chemical specific cartridge and N95 filters
 - Ingredient Information from SDS for product at use dilution – 0.5% hydrogen peroxide

Additional considerations when selecting respiratory protection

In addition to selecting respiratory protection to meet regulatory requirements, other considerations such as comfort and ease of program administration can become important for a successful respiratory protection program. Fit testing of tight-fitting respirators is required under the OSHA Respiratory Protection Standard (29 CFR 1910.134). In addition, facial hair must not interfere with a tight-fitting respirator seal or function. Options to tight-fitting respirators may include Powered Air Purifying Respirators (PAPRs) with loose-fitting headgear. Below are examples of tight-fitting respirator facepieces and loose-fitting headgear for PAPRs:



If resources for fit testing or managing worker facial hair compliance are limited, employers may want to consider PAPR respiratory protection as part of minimizing the administrative burden of a respiratory protection program.

References

- <https://www.epa.gov/coronavirus/can-i-apply-product-using-method-not-specified-directions-use>
- <https://www.epa.gov/pesticide-registration/expedited-review-adding-electrostatic-spray-application-directions-use>
- <http://www.osha.gov/respirators>
- <http://www.3m.com/respirators>
- <https://www.epa.gov/coronavirus/can-i-use-fogging-fumigation-or-electrostatic-spraying-or-drones-help-control-covid-19>
- https://www.3m.com/3M/en_US/safety-centers-of-expertise-us/respiratory-protection/respirator-selection/