The air you breathe

Oregon OSHA's respiratory protection guide for agricultural employers

About this guide

The Air You Breathe is an Oregon OSHA Standards and Technical Resources publication.

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Topic categories: *agriculture, respiratory protection*

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Introduction

Our lungs are vulnerable. With repeated exposure to toxins, the protective mechanisms that keep our lungs healthy break down. We may not even be aware of the symptoms — loss of energy or appetite, a tight feeling in the chest, shortness of breath, a persistent cough — until the damage is done. Consider the health risks of long-term smoking, for example: *chronic obstructive pulmonary disease (COPD) and lung cancer*.

Workers are also at risk when they breathe contaminated air. You may have heard of "farmer's lung," an allergic disease caused by breathing the organic dust from moldy materials such as hay, straw, and grain. Farmer's lung has affected increasing numbers of agricultural workers in recent years. Many are forced to leave the occupation due to this debilitating respiratory disease.

Agricultural workers may be exposed to many hazards that can cause respiratory problems. Some examples are dust, biological particles, pesticides and other chemicals, or toxic gasses such as nitrogen dioxide (in silos) or hydrogen sulfide (near manure pits). Also, confined spaces, such as silos and grain storage bins may not have enough oxygen to keep you alive!

In this guide you'll learn what you can do to protect yourself and your employees from agricultural respiratory hazards. You'll learn about the basic types of respirators and how to develop an effective respiratory protection program — the main requirement of Oregon OSHA's respiratory protection standard for agriculture, available in **OAR 437-004-1041, Respiratory Protection**.

User-friendly features. We want you to learn from our guide and we want you to use it. We've enclosed a DVD that includes a short video about the proper use of respirators and a CD that includes a sample respiratory protection program that you can modify for your workplace and use as your own.

1 Control the hazards first

The respiratory protection rule for agricultural employers, **OAR 437-004-1041(1)(a)**, reminds us that the best way to control occupational diseases caused by contaminated air is to prevent the contamination with engineering controls.

An “engineering control” is a measure that prevents or controls an employee’s exposure to a hazard—in this case contaminated air. For example, removing the source of the air contaminant with local exhaust ventilation or separating employees from the sources of contamination both prevent exposure to the contaminant in the air they breathe. Eliminating the toxic material by choosing to use a nontoxic (or less toxic) material in your work process is another type of engineering control.

If these types of controls are not feasible, and it is still necessary to protect your employees from these exposures, then you must provide respirators for them to use. You must also have an effective respirator program that includes, at a minimum, the requirements of the respiratory protection rule.

2 Who needs respiratory protection?

You need to provide respiratory protection if your employees are exposed to air contaminants above the permissible exposure level (PEL) (a few are listed on page 7), or if they must work in areas where there is less than 19.5 percent oxygen, by volume. The type of respirator you choose must effectively protect the employees from the hazard or provide the type of air necessary to sustain life.

The harmful elements of air-contaminants exposure consists of four parts: physical state, toxicity, concentration, and how long the employees are exposed to it.

Your employees might need to wear respirators if they:

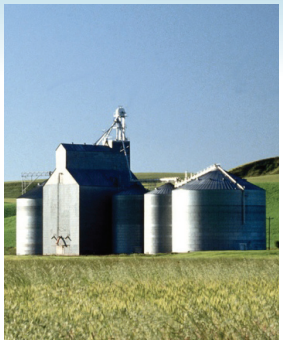
- Mix or apply fertilizers and pesticides
- Mix or handle “soil-less” potting materials or soil amendments, such as peat moss, compost, and perlite (in container stock nurseries).
- Work with paints or solvents
- Weld metals
- Clean grain bins
- Uncap or work in silos
- Work with corn silage
- Handle moldy hay or grain
- Handle certain feeds or fish meal
- Work in confined animal facilities
- Clean up bird or rodent droppings or animal hair

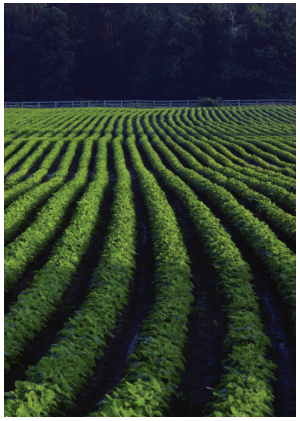
Without the right protection, exposure to air contaminants can kill your employees, make them sick, or cause serious lung diseases.

Sources of common agriculture air contaminants

	Confined hog or poultry housing	Tractor operation/ internal combustion engines	Manure pits	Pesticides & fertilizers	"Soil-less" potting mixes or soil amendments	Silage/ grain in storage
Ammonia	✔		✔	✔		✔
Biological particles *(See note below)*	✔	✔	✔	✔	✔	✔
Carbon monoxide		✔				
Dusts	✔	✔		✔	✔	✔
Vapors		✔		✔		
Hydrogen sulfide	✔		✔			
Methane	✔		✔			
Mists, fogs				✔		
Nitrogen oxides		✔				✔

NOTE: Biological particles come primarily from living sources, including plants and animals. This type of airborne dust particle may contain dried fecal matter, fungal or mold spores, bacterial cells and spores, pollen grains, insect parts, animal hair, or feathers.





3 How respirators work

Respirators work in two ways: they either purify the existing air with filters, cartridges, or canisters (air-purifying respirators) or they supply clean air through a compressor or a compressed-air cylinder (supplied air respirators).

If you have an oxygen-deficient atmosphere or work around contaminants that can NOT be effectively removed by an air-purifying respirator, only a supplied air respirator will protect you.

Two types of commonly used air-purifying respirators are dust masks and powered air-purifying respirators (PAPRs).The most common disposable respirator is the filtering facepiece or dust mask respirator. You can use a NIOSH-approved dust mask for protection against airborne particles during most tractor work in dusty fields, cleaning dusty barns, haying, handling soil-less mixes and dust-producing soil amendments, or applying lime and fertilizers. Dust masks won't protect against gasses, chemical vapors or mists (like pesticide sprays), or in oxygen-deficient areas. Also, the protection is lost if the mask is poorly fitted or worn too loosely. Use only NIOSH-approved filtering facepieces: N-95s are the most common type available and can be used for common dust exposures. N-100s or P-100s are recommended for preventing exposures to biological contaminants.

N-series filters should be used only for non-oil (solid and water-based) aerosols. P-series filters or prefilters should be selected if there are both oil (lubricants and pesticide spray adjuvants) and non-oil aerosols in the workplace.

A PAPR has a battery-powered fan that blows filtered air inside a tight-fitting respirator or a loose-fitting hood or helmet. Employees with facial hair or facial features that interfere with a tight-fitting respirator can still use a loose-fitting PAPR. Use this type of respirator for protection against dusts, mists, and certain gasses and vapors — but only with appropriate filter canisters. High-efficiency particulate (HEPA) filters are available for PAPRs that correspond to the P-100 category used for nonpowered respirators. In addition to the standard limitations of any air-purifying respirator, PAPRs function only if the batteries have the power to draw air through the filtering media. If the blower stops, the positive pressure is lost and the protection stops.

Don't use PAPRs where the oxygen level is low or in areas with heavy concentrations of toxic contaminants. These Immediately Dangerous to Life or Health (IDLH) areas require the use of supplied air respirators.

For information about selecting and using respirators, contact local safety supply stores, safety and health professionals, your workers' compensation insurance carrier, or Oregon OSHA's consultation service.

Permissible Exposure Limit (PEL) or Ceiling Limit for Common Agricultural Air Contaminants

Air contaminant	Oregon OSHA PEL or Ceiling Limit
Ammonia (CAS # 7664-41-7)	**18 mg/m3**
Carbon monoxide (CAS # 630-08-0)	**50 ppm or 55 mg/m3**
Grain dust (oat, wheat, barley)	**10 mg/m3**
Gypsum (CAS # 13397-24-5)	
Total dust	**10 mg/m3**
Respirable fraction	**5 mg/m3**
Hydrogen sulfide (CAS # 7783-06-4)	**Ceiling limit of 20 ppm or 50 ppm for 10 min. once, only if no other measurable exposure occurs**
Methane (CAS # 74-82-8)	**1,000 ppm**
Nitrogen dioxide (CAS #10102-44-0)	**Ceiling limit of 5 ppm**
Particulates not otherwise regulated (PNOR)	
Total dust	**10 mg/m3**
Respirable fraction	**5 mg/m3**
Perlite (CAS # 93763-70-3)	
Total dust	**10 mg/m3**
Respirable fraction	**5 mg/m3**

Key

- PEL is based on an eight-hour time-weighted average of personal exposure.
- Ceiling limit is a concentration that must not be exceeded during any exposure.
- CAS# is the Chemical Abstracts Service registry number, a unique identifier for each chemical.
- Mg/m^3 is milligrams of substance per cubic meter of air.
- Ppm are parts of substance per million parts of air.
- PNOR stands for particulates not otherwise regulated. All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by the PNOR limit. It is the same as the inert or nuisance dust limit of Table Z-3 in OAR 437-004-9000 Air Contaminants.
- The “respirable fraction” is the portion of the particulate matter collected during personal air monitoring that is less than 10 micrometers in diameter. Particles of dust of this size can be drawn deep into the lungs. Larger particles tend to be trapped in the nose, mouth, or throat.

For more information, see **OAR 437-004-9000 Air Contaminants**.

4 Developing and managing your respiratory protection program

Essential elements of a respiratory protection program

You can't just hand out respirators and expect that your employees will be protected.

If you evaluate your workplace, find respiratory hazards, and determine that respirators are necessary to protect your employees, you must have a written respiratory protection program.

The program must describe how to do the following:

- ***Choose the right respirator for the hazardous environment or task.***
- ***Provide medical evaluations for employees who will use respirators.***
- ***Fit test employees who use tight-fitting respirators.***
- ***Train employees to use respirators properly and recognize respiratory hazards.***
- ***Ensure that respirators are properly cleaned, maintained, and stored.***
- ***Establish a schedule for changing filters, cartridges, and canisters.***
- ***Periodically review the program's effectiveness.***

If you want a template for your respiratory protection program, just insert the CD that accompanies this publication and fill in the blanks to create a customized program that meets the needs of your workplace.

Who can manage your respiratory protection program?

The program manager must be a "knowledgeable person," someone – you or one of your employees – who has the appropriate training, knowledge, and experience with respirators. Certification isn't necessary. The program manager can delegate parts of the program, such as respirator fit testing or respirator cleaning and maintenance, to other qualified employees but must oversee their activities and the overall effectiveness of the program.

Choose the right respirator

Choosing the right respirators is an important part of providing real protection. You will need detailed information about the type of air contaminants that your employees are exposed to.

Determine the following:

What air contaminants could your employees be exposed to during their work tasks or at the job site? Consider all types of chemical exposures plus exposures to dust, vapors, mists, and fumes – such as those created by work processes like welding or operating internal combustion engines.

What physical state are the contaminants in?

- **Solid –** dusts, fumes (Examples: Biological particles, welding fumes)
- **Liquid –** mists, fogs (Example: Pesticide spray)
- **Gas –** atmospheric gases, vapors (Examples: Carbon monoxide, solvent vapors)

How long will your employees be exposed and at what concentration?

Knowing your employees' exposure levels is critical to choosing appropriate respirators. You can determine the exposure level by measuring or estimating based on data from previous measurements. Examples include the following:

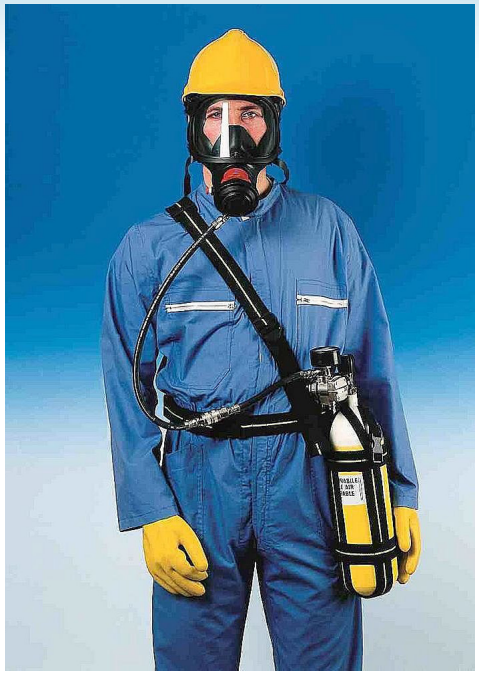
- Measure the exposures of individual employees by sampling their breathing air during various work processes. This procedure — called personal exposure monitoring — is the most accurate way to measure.
- Sample the air at specific locations — called area monitoring — to estimate exposures affecting groups of employees. This method is useful when employees move about and may not always be near a hazard.
- Use representative exposure data from industry studies, trade associations, or product manufacturers to estimate exposures affecting groups of employees. You must be able to show that the data is based on conditions very similar to those where your employees work.

Approved respirators

New pesticide labels will list a respirator with a NIOSH TC approval number and describe the respirator.

Examples: "NIOSH-approved respirator TC-23C with a pre-filter approved for pesticides."

"NIOSH-approved respirator with an organic vapor (OV) cartridge with any N, R, P, HE filter."



SCBA (self-contained breathing apparatus)

Does the air contaminant irritate the skin or eyes?

- If it does, you may choose to provide a full-face respirator or other additional eye and skin protection.
- If not, a half-mask respirator may be sufficient.

Will your employees use pesticides?

- If they will, which pesticides will they use? Employees must use, at a minimum, the type of respirator specified on the label of the pesticide product.

Will anyone be required to enter spaces where low oxygen levels or other IDLH conditions could exist? In an IDLH atmosphere, the substance is toxic enough or concentrated enough that an exposure could kill or seriously injure you. Supplied air respirators are the only effective protection in these areas.

Do you need help understanding exposure levels? A workplace health specialist, such as an industrial hygienist, can help you evaluate employee exposures, interpret the monitoring results, and suggest how to lower exposures to safe levels. You can get this type of help from your workers' compensation insurance carrier, from Oregon OSHA's consultation services, or you can hire a private consultant.

Where to buy respirators

You can find most types of respirators at safety supply stores. Check farm supply stores and agricultural chemical suppliers. Respirators are also available online and through mail-order safety supply companies. Remember that everyone's face is different. You must provide a selection of sizes and perhaps more than one brand or model of the tight-fitting types so that employees can be properly fit tested. Only buy NIOSH-certified respirators that show a NIOSH approval number.

Provide medical evaluations for employees who will use respirators

You must provide confidential medical evaluations to your employees before they use respirators to ensure that they can wear them without endangering their health.

Respirators make it harder to breathe, especially for those employees who smoke or who have medical conditions such as asthma, allergies, pulmonary diseases, high blood pressure, heart disorders, or claustrophobia. Minor facial abnormalities or dental conditions can also make it difficult to fit some employees with a tight-fitting respirator.

A physician or other professionally licensed health care professional (PLHCP) must do the evaluation at no cost to the employee. You must provide the PLHCP with the following information:

- The type and weight of the respirator that the employee will use.
- How long and how often the employee will use the respirator.
- How much physical work the employee will do while using the respirator.
- The types of other personal protective equipment the employee will use.
- The general temperature and humidity of the work environment.
- A copy of your respirator program.
- A copy of the respiratory protection rules for agricultural employers (OAR 437-004-1041 Respiratory Protection).

Employees must be medically re-evaluated when their work changes; when the respiratory program manager, a supervisor, or the PLHCP says another evaluation is necessary; or when the employee shows medical symptoms that affect their ability to safely use a respirator.

The medical evaluation questionnaire

You must allow employees to complete a medical-evaluation questionnaire at a time and place convenient for them. The professionally licensed health care professional will use the questionnaire he or she fills out to conduct the evaluation.

It is important that employees answer the questions completely and truthfully. If they don't read English or Spanish or don't understand the questions, they should get help from a friend, family member, or the PLHCP. Because their responses are confidential, the employer may not help them other than to explain the questions. Employers may not read the questionnaire after the questions have been answered. Employees have the right to discuss the questionnaire and the results of the medical evaluation with the PLHCP.

Fit test employees who use respirators that have tight-fitting facepieces

Tight-fitting respirators protect employees by forming a seal against the face. Respirators, including filtering facepieces or dust masks, that filter atmospheric air by drawing it through a cartridge, canister, or filter are classified as tight-fitting and must be fit tested. In addition, all masks used with supplied air must be tight-fitting.

Human faces vary in size and shape as do respirator facepieces. Before your employees use respirators with tight-fitting facepieces in the workplace, they must be fit tested to ensure that the face-to-facepiece seal doesn't leak air.

Employees must be fit tested annually; whenever they change facepiece models, styles, or sizes; and when they have a physiological change such as significant weight loss or weight gain, or dental work that affects the shape of the face and the face-to-facepiece seal.

The simplest type of fit test is called a qualitative fit test. It's inexpensive, easy to perform, and relies on the respirator user's response to a test agent such as Bitrex™ or irritant smoke. If the user smells or tastes the test agent while performing the test, the facepiece doesn't fit or isn't sealing properly. The user must be retested and may require another size or type of facepiece. Anyone can conduct a fit test as long as they have the right supplies and equipment and follow the protocols in Appendix A of the Respiratory Protection Standard. (See *OAR 437-004-1041, Appendix A*)

For more information, see page 18, "How to perform a fit test."

Train employees to protect themselves from respiratory hazards

Before your employees can use respirators, they must know:

- Why respirators are needed at the workplace.
- Why respirators must fit correctly and be properly maintained.
- The capabilities and limitations of different types of respirators.
- When to change filters, cartridges, or canisters.
- How to recognize medical symptoms such as dizziness or shortness of breath that limit the safe use of respirators.
- The general requirements of your respiratory-protection program.

They must be able to demonstrate these skills:

- How to inspect, clean, and properly store respirators.
- How to seal-check tight-fitting respirators.
- How to identify and choose the correct types of filters, cartridges, or canisters for respirators they will use at the workplace.
- How to change filters, cartridges, or canisters.
- How to properly use any emergency respirators present in their workplace.

Training must be in a language or form that the workers understand. You can choose the trainer and determine the training format, but the training must include the information listed above. New employees are exempt from initial training if they have been trained within the past 12 months and can show a working knowledge of the above topics and demonstrate the required skills.

Retrain all employees who are part of your program at least annually. Retrain sooner if the workplace hazards change or if employees switch to another type of respirator. You must also retrain employees who don't demonstrate the proper use or maintenance of their respirators.

Ensure that respirators are clean and properly maintained

Employees can clean and maintain their own personal respirators or you can delegate the work to someone who has proper training and experience.

- Respirators must be checked for proper function and condition before each use and after they're cleaned.
- Discard defective respirators or have an appropriately trained person repair them with parts made for the same make and model.
- Clean, disinfect, and inspect shared respirators before they're used by another person.
- Inspect emergency-use respirators at least monthly and document the inspections.
- Be sure employees store their respirators in a place free from contamination, dust, sunlight, extreme temperatures, and excess moisture, and so that the facepieces and valves are not deformed. Large, self-sealing plastic bags are ideal for storing clean respirators.
- Never leave used filters, cartridges, or canisters on the respirator during storage. If reused, they should be stored separately from the respirator in their own sealed plastic bags and handled with the same precautions as the air contaminant they were used for.

Establish a schedule for changing filters, cartridges, and canisters

You must establish a change-out schedule for filters, cartridges, and canisters based on the end of service life indicators or on a maximum use time determined by the manufacturer, the product label, or first detection of breakthrough by the employee.

If respirators are required on the pesticide label, then the requirements for replacing filters, cartridges, and canisters in the Worker Protection Standard apply. See Div 4/W 437-004-6000, 170.240(f) (6) & (7)

For dust/mist filtering respirators, the employer must ensure that the filters are replaced:

(i) When breathing resistance becomes excessive.

(ii) When the filter element has physical damage or tears.

(iii) According to manufacturer's recommendations or pesticide product labeling, whichever is more frequent.

(iv) In the absence of any other instructions or indications of service life, at the end of each day's work period.

For gas- or vapor-removing respirators, the employer must ensure that the canisters or cartridges are replaced:

(i) At the first indication of odor, taste, or irritation.

(ii) According to manufacturer's recommendations or pesticide product labeling, whichever is more frequent.

(iii) In the absence of any other instructions or indications of service life, at the end of each day's work period.

Common Air-Purifying Cartridges Used in Agriculture

Color:	Type/ Contaminant used for:
Purple (magenta)	**P-100 / Any particulate** *(including oil mist)*
Orange	**P-95, P-99, R-95, R-99, R-100 / Any particulate** *(P=oil-proof and R= oil-resistant.)*
Teal (greenish-blue)* * *Teal is not a color listed by NIOSH, but is commonly used*	**N-95, N-99, or N-100 / Any particulate** *(free of oil, only)*
Black	**Organic vapors** *(solvents and certain pesticides, for example)*
Green	**Ammonia gas**
Yellow and white	**Chlorine**

Factors that affect your filter, cartridge, and canister change-out schedule

There are many factors that can affect the usable cartridge service life and the degree of respiratory protection that you can reasonably expect under workplace conditions.

Consider these factors when developing a cartridge change-out schedule:

- Type of contaminants.
- Concentration of the contaminants.
- Relative humidity at the worksite.
- Temperature at worksite.
- Breathing rate of the respirator user (more strenuous work = a higher rate of breathing).
- Predictable changes in contaminant concentration, temperature, humidity, and breathing rate over a work shift.
- Uncertainty about the conditions – contaminant concentration in the workplace can vary greatly.
- Mixtures of contaminants – using a cartridge against multiple contaminants versus one contaminant at a time.
- Cartridge storage conditions – exposure to trace levels of contaminants, humidity, or elevated temperatures affect service life.
- Age of the cartridge – many have expiration dates.
- Physical condition of the cartridge and respirator.
- User training, experience, and fitness.
- Warning properties of the contaminant – if it has good warning properties and you can smell it at concentration levels less than the dangerous levels, then smell may provide a secondary or back-up indication for cartridge change-out. If the contaminant has poor warning properties, most people can't smell it until its concentration is dangerously high, and a greater margin of safety for changing the cartridge will be needed.
- Other conditions specific to the particular user or the workplace.

Review your program's effectiveness

Periodically review each part of your respirator program. You don't need to do the review on a fixed schedule; however, it should be performed often enough to keep the program current and effective.

Review your program by observing how employees use their respirators, asking them for their opinions, and listening to their concerns. Consider the following:

- Are their respirators appropriate for their work tasks and environments?
- Do their respirators fit?
- Do employees use, maintain, and store their respirators correctly?
- Do they have any problems or concerns about the program, equipment, or when to use their respirators?
- Are all of the program elements working effectively?
- Are there any parts of the program that are not working and should be updated or changed?

Voluntary use of respirators

Even if you determine, by evaluating the conditions at your workplace, that respirators are not required, you can provide filtering facepieces (dust masks) for the comfort of your employees or allow employees to use their own respirators voluntarily. You are not required to provide respirators, train, or fit test these voluntary users.

If you only allow the voluntary use of dust masks, you are responsible to provide the information in Appendix D of OAR 437-004-1041 to each user and to ensure that the dust masks are kept in a sanitary condition.

If you allow employees to voluntarily use any other tight-fitting respirator, you have other responsibilities. In addition to providing the Appendix D information to each voluntary user and ensuring that the masks are kept in a sanitary condition, you must also provide an initial medical evaluation to ensure that the employees are able to use these respirators without adverse health effects.

5 How to perform a fit test

Before you begin the test

- This test can only be used for respirators with P100 series filters or high-efficiency particulate air (HEPA) filters.
- The employee should wear chemical-resistant goggles during this test so that the smoke doesn't irritate his or her eyes. Make sure the eye protection is placed so that it doesn't interfere with the respirator fit.
- The test may not be performed if there is any hair (including beard stubble) that comes between the skin and sealing surface or that interferes with the valves inside the respirator.
- Any clothing item, such as a hat, that interferes with the respirator's fit must be removed before the test.

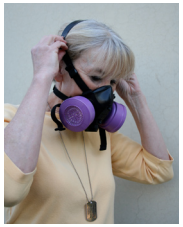
You'll need the following to perform this test:

- A well-ventilated area.
- An irritant smoke kit that includes irritant smoke tubes, aspirator bulb, and a smoke tube opener.
- A variety of facepiece sizes and styles for the employee to choose. They must choose the one that provides the best fit.
- A mirror for the employee to use to evaluate fit and position of the respirator.

The following is an example of a qualitative fit test that uses irritant smoke as the test agent.

Step 1: Confirm sensitivity to irritant smoke.

With the respirator off, squeeze the bulb so that it produces a very small amount of irritant smoke and have the employee sniff it lightly. The smoke should cause the employee to cough.



Step 2: Put on the respirator.

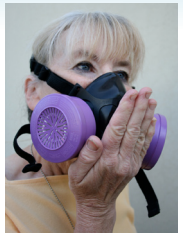
Have the employee put on the respirator, position it, and set the strap tension without help. The employee should wear the respirator for at least five minutes to ensure that it's comfortable before beginning the test.

Recordkeeping

Be sure to keep a record of fit test results and update the record, at least annually, when the employee is retested. Include the following information:

- Test date.
- Employee's name.
- Fit test type, such as irritant smoke, Bitrex™ solution, or other qualitiative or quantitative type.
- Specific make, model, style, and size of the respriators tested.
- Specific make, model, style, and size of the respirators that the employee will use.
- For qualitative tests, keep pass/fail results.
- For quantitative tests, keep the fit factor and strip chart, or other recordings.

Step 3: Perform a positive and negative seal check.



A seal check determines if the facepiece is working properly under positive and negative pressure. The employee must do the following to check positive and negative pressure:

Positive-pressure check

a. Block the exhalation valve by covering it with the palm of your hand.

b. Exhale gently into the facepiece, creating a slight positive pressure.

c. If you can feel air leaking under the facepiece, reposition the facepiece and repeat steps ***a*** and ***b*** until you have an effective seal.

Negative-pressure check

a. Block the inlet openings of the cartridges or canisters with palms or your hands.

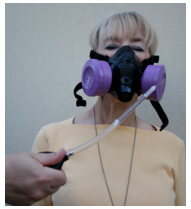
b. Inhale gently so that the facepiece collapses, creating a slight negative pressure.

c. Hold your breath for about 10 seconds. The seal is effective if the facepiece stays collapsed.

d. If the facepiece expands or you can feel air leaking under the facepiece, reposition it and repeat steps ***a***, ***b***, and ***c*** until you have an effective seal.

Step 4: Perform the irritant smoke test.

Both the person being fit tested and the person conducting the fit test should wear chemical-resistant goggles during this step so that the smoke doesn't irritate their eyes.



General procedure

Keeping the smoke tube 12 inches away from the mask and downwind from the fit tester, squeeze the bulb every 20 seconds, making slow passes around the outside edge of the mask.

Perform the general procedure while the person being tested does the following:

- **Breathes normally** for one minute.
- **Breathes deeply** for one minute – don't hyperventilate.
- **Moves his or her head side-to-side**, slowly for one minute.
- **Moves his or her head up and down**, slowly for one minute.
- **Talks** for one minute – read the "rainbow passage" or count to 100.
- **Grimaces**, moving his or her face muscles by smiling or frowning for 15 seconds.
- **Bends over** from the waist and then back up again, slowly for one minute.
- **Breathes normally** for one minute.

Those who detect smoke at any time during this test must reposition or tighten the respirator or select another one and begin the test again at step 3. Otherwise, the respirator may not be adjusted until the end of step 4.

Step 5: Confirm sensitivity to irritant smoke.

Have the employee remove the respirator and repeat step 1.

A respiratory protection checklist for agricultural employers

- ❑ Evaluate the respiratory hazards at your workplace to determine the types of respirators that will protect your employees.
- ❑ If respirators are necessary to protect your employees or you require employees to wear respirators, have a written respiratory protection program specific to your worksite and managed by a knowledgeable person.
- ❑ Before employees use respirators, provide medical evaluations to ensure that they are physically able to use respirators.
- ❑ Fit test employees who use respirators with tight-fitting facepieces. Employees must be fit tested annually and whenever they change facepiece models, styles, or sizes, or if they have a physiological change that affects the face-to-facepiece seal.
- ❑ Keep a record of the details of each employee's fit test results.
- ❑ Ensure that employees are trained before they use respirators for the first time and annually thereafter. Employees must also be retrained if they don't understand how to use or care for their respirators or if changes in their work makes previous training obsolete.
- ❑ Ensure that employees clean and disinfect the respirators as often as necessary when used exclusively by one employee and after each use when used by more than one employee.
- ❑ Ensure that employees inspect their respirators for defects whenever they use them and while cleaning them.
- ❑ Periodically evaluate your program to ensure that it's effective.

6 Rules and definitions

Div 4/I OAR 437-004-1041, Respiratory protection
Oregon OSHA's respiratory protection standard for agricultural employers.

437-004-1041, Appendix A
Mandatory fit testing procedures.
437-004-1041, Appendix B-1
Mandatory seal-check procedures.
437-004-1041, Appendix B-2
Mandatory respirator cleaning procedures.
437-004-1041, Appendix C
Mandatory respirator medical evaluation questionnaire (English and Spanish).
437-004-1041, Appendix D
Information for employees who ask to use respirators voluntarily (English and Spanish).

Div 4/W OAR 437-004-6000, 170, The pesticide Worker Protection Standard (WPS)

Div 4/Z OAR 437-004-9000 Air Contaminants.

air contaminant

A substance that contaminates the air we breathe such as particulate matter including dusts, fumes, smoke, gasses, mists, or vapors.

air-purifying respirator

A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

ambient

Within a surrounding area or environment.

ammonia

The compound, chemical formula NH3, has a sharp odor characteristic of household ammonia. The gas can severely irritate eyes, nose, throat, and lungs. Exposure to high concentrations can be fatal.

APF (assigned protective factor)

The workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program. For non-IDLH situations, employers must use the assigned protection factors listed in Table 1 of OAR 437-004-1041 to select a respirator that meets or exceeds the required level of employee protection.

approval number (NIOSH)

A number that indicates a respirator has been approved by the National Institute for Occupational Safety and Health (NIOSH). Respirators certified by NIOSH include labels that say “NIOSH Approved” and may have an approval number. Always check the label to ensure that the respirator will protect employees from the contaminants that they’re exposed to.

area monitoring

Measurement of the level of contaminants within a general area.

biological particles (air contaminant)

A complex mixture primarily from living sources, including plants and animals. They may contain fecal particles, fungal spores, bacterial cells and spores, pollen grains, insect debris, hair, and minerals. The average size of this type of airborne “dust” particle are in a range that can cause injury and reactions in the upper airways as well as the deeper portions of the lungs.

carbon dioxide

The compound, chemical formula CO2, is an odorless gas that is normally found in the atmosphere. Because it is heavier than air, it can settle near the bottom of confined areas. At lower concentrations, carbon dioxide can cause labored breathing, drowsiness, and headache. At high concentrations, carbon dioxide can displace enough oxygen to cause death by asphyxiation.

carbon monoxide

The compound, chemical formula CO, is a poisonous gas that is a component of the exhaust of internal combustion engines. Exposure can cause illness, permanent neurological damage, and death. Because it is colorless, odorless, and nonirritating, CO can overcome exposed people without warning — there is little time before they experience symptoms that inhibit their ability to seek safety.

cartridge/canister

A respirator component containing a filter, sorbent, or catalyst that removes specific air contaminants.

change-out schedule

A replacement schedule that ensures canisters and cartridges are replaced before the end of their service life. Change-out schedules are required for canisters and cartridges that do not have end-of-service-life indicators (ESLI) certified by the National Institute for Occupational Safety and Health (NIOSH).

confined space

A space that is large enough and configured so that an employee can enter and work; has limited or restricted entry or exit, such as tanks, vessels, silos, storage bins, hoppers, vaults, and pits; and is not designed to be occupied. Atmospheric hazards, engulfment and configuration hazards, and other recognized hazards may also be present.

dusts

Minute solid particles of mineral or organic origin that are either deposited on surfaces or suspended in the air.

facepiece

A tight-fitting enclosure that fits over the face and forms a protective barrier between the user's respiratory tract and the ambient air.

filter

A respirator component that removes solid or liquid particles (aerosols) from the air.

fit factor

The ratio of the concentration of a contaminant in the environment to the concentration inside the mask. A quantitative measure of how well a respirator protects the user.

HEPA (high-efficiency particulate air filter)

A filter that is at least 99.97 percent efficient in removing mono-disperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

hydrogen sulfide

The compound, chemical formula H2S, is a highly toxic gas with a "rotten egg" odor at low concentrations. Higher concentrations can paralyze the sense of smell. At low concentrations, the gas can cause dizziness, headache, nausea, and irritation of the nose and throat. H2S can also severely irritate and damage the eyes. At high concentrations, hydrogen sulfide can cause unconsciousness, respiratory failure, and death within minutes. Because this gas is heavier than air, it can settle near the bottom of confined areas. H2S is also explosive at a wide range of concentrations in air – 4.3 percent to 46 percent, by volume.

IDLH (immediately dangerous to life and health)

Refers to any atmosphere that poses an immediate threat to a worker's life, would cause irreversible adverse health effects, or would impair the worker's ability to escape.

methane

The compound, chemical formula CH4, is an odorless gas that is flammable or explosive at concentrations of 5 percent to 15 percent by volume of air. At high concentrations, methane can displace enough oxygen to cause death by suffocation. Because this gas is lighter than air, it rises to the top of confined areas.

mists/fogs

Condensed water vapor, a fine spray, a liquid contaminant, or a smoke-like fume suspended in the air.

NIOSH certification program for respirators

The requirements found in 42 CFR 84 for testing and certifying non-powered, air-purifying, particulate-filter respirators.

NIOSH approval number

See “approval number.”

nitrogen oxides

Chemical compounds with the formula NOx. Nitrogen dioxide, NO2, is a reddish-brown toxic gas with a characteristic sharp, biting odor.

oxygen-deficient atmosphere

An atmosphere that has less than 19.5 percent oxygen by volume.

personal air monitoring

Measurement of an individual’s exposure to contaminants with personal monitors or sample collection equipment.

PLHCP (physician or other professionally licensed health care professional)

A person licensed to provide respirator medical evaluations or examinations.

PAPR (powered air-purifying respirator)

A type of air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

respiratory hazard

Any harmful substance in the air you breathe.

SCBA (self-contained breathing apparatus)

A type of atmosphere-supplying respirator that isn't connected to a stationary source of breathable air. The user carries the air supply.

seal check

A set of procedures performed by the respirator user to determine if the respirator has an effective face-to-facepiece seal.

service life

The period of time that a respirator, filter, sorbent, or other respiratory equipment provides adequate protection.

tight-fitting facepiece

An inlet covering or mask that forms a complete seal against the user's face.

voluntary use

When an employee chooses to wear a respirator even though it is not required by an employer or by any Oregon OSHA rule.

Oregon OSHA Services

Oregon OSHA offers a wide variety of safety and health services to employers and employees:

Consultative Services

- Offers no-cost, on-site safety and health assistance to help Oregon employers recognize and correct workplace safety and health problems.
- Provides consultations in the areas of safety, industrial hygiene, ergonomics, occupational safety and health programs, assistance to new businesses, the Safety and Health Achievement Recognition Program (SHARP), and the Voluntary Protection Program (VPP).

Enforcement

- Offers pre-job conferences for mobile employers in industries such as logging and construction.
- Inspects places of employment for occupational safety and health hazards and investigates workplace complaints and accidents.
- Provides abatement assistance to employers who have received citations and provides compliance and technical assistance by phone.

Appeals, Informal Conferences

- Provides the opportunity for employers to hold informal meetings with Oregon OSHA on concerns about workplace safety and health.
- Discusses Oregon OSHA's requirements and clarifies workplace safety or health violations.
- Discusses abatement dates and negotiates settlement agreements to resolve disputed citations.

Standards and Technical Resources

- Develops, interprets, and provides technical advice on safety and health standards.
- Provides copies of all Oregon OSHA occupational safety and health standards.
- Publishes booklets, pamphlets, and other materials to assist in the implementation of safety and health standards and programs.
- Operates a Resource Center containing books, topical files, technical periodicals, and a video lending library.

Public Education & Conferences

- Conducts conferences, seminars, workshops, and rule forums.
- Coordinates and provides technical training on topics such as confined space, ergonomics, lockout/tagout, and excavations.
- Provides workshops covering management of basic safety and health programs, safety committees, accident investigation, and job safety analysis.
- Manages the Safety and Health Education and Training Grant Program, which awards grants to industrial and labor groups to develop training materials in occupational safety and health for Oregon workers.

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541-276-9175
Consultation: 541-276-2353

Notes

The air you breathe

CD — The air you breathe

Customizable respiratory protection programs and forms for agricultural employers

DVD — Breathe Easy

Covers respirator safety, including selecting respirators, fit testing, maintenance, and storage.

440-3654 (3/10)

DEPARTMENT OF CONSUMER & BUSINESS SERVICES

Oregon OSHA

OR-OSHA