Breathe Right!

Guide to developing a respiratory protection
program for small-business owners and managers

OSHA | Oregon
OSHA

Department of Consumer
and Business Services

Examples of tight-fitting facepieces

Half mask
Filtering Facepiece
Dust mask

Assigned protection factors (APF)=10

Half mask
Elastomeric Respirator

APF=10

Full Facepiece
Elastomeric Respirator

APF=50

Courtesy of Federal OSHA

About this document

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Introduction

The air we breathe

During a normal day, the air we breathe is mostly oxygen and nitrogen — although it still contains trace amounts of harmful gases, smoke, vapors, and dust produced by us and Mother Nature. Fortunately, our lungs have a series of mechanical and biological barriers that keep such contaminants from harming us. But healthy lungs aren't invincible. With repeated overexposure to toxins, these protective barriers break down, resulting in irritation, discomfort, or disease.

Breathing in the workplace

Black lung, farmer's lung, asbestosis, silicosis — these are just a few of the medical conditions that result when workers breathe contaminated air. Protecting workers can be difficult, however, because there are so many types of contaminants and there is no single method for controlling them in all workplaces.

If you're a small-business owner or manager who wants basic information about protecting your employees from respiratory hazards, this guide will get you started.

You'll learn about the basic types of respirators and what you need to do to develop an effective respiratory protection program – the essential requirement of Oregon OSHA's respiratory protection standard, 1910.134. This standard specifies what you must do to ensure that your employees use respirators safely and responsibly. You'll find references to 1910.134 and the respiratory-protection program requirement in many other Oregon OSHA rules for protecting workers from toxic and hazardous substances.

About respiratory hazards

Respiratory hazards include harmful substances and below-normal concentrations of oxygen in the air we breathe. What makes a substance harmful depends on its toxicity, chemical state, physical form, concentration, and the period of time one is exposed. Examples include particulates, gases, vapors, and biological organisms. Harmful effects are wide ranging and may occur immediately or take years to develop.

When the oxygen concentration in normal breathing air drops below 19.5 percent by volume, the air becomes oxygen deficient — a significant concern for those who work in confined spaces. Effects can include impaired thinking and coordination, unconsciousness, and death.

Examples of respiratory hazards

Particulates: These are airborne particles such as dusts, fibers, fumes, mists, soot, and smoke. Some are so small they can only be seen with an electron microscope. The diameter of a particulate is usually measured in micrometers (one micrometer equals 1/1,000 millimeter or 1/25,400 inch). Particles with diameters under 10 micrometers are more likely to enter the respiratory system.

Gas and vapors: Gases can spread freely in the air. Vapors are the gaseous states of substances that are liquids or solids at room temperature. Gases and vapors are classified by their chemical forms.

Biological organisms: These include bacteria, viruses, fungi, and other living organisms that can cause respiratory infections.

Oxygen-deficient atmosphere: Normal air has an oxygen concentration of 20.8 percent by volume. When the concentration drops below 19.5 percent, the air is oxygen deficient and considered immediately dangerous to life and health (IDLH).

Protection from respiratory hazards

Protect workers from respiratory hazards by doing the following:

- Identify the respiratory hazards in your workplace.

- Evaluate employees' exposures to each hazard.

- Use the information to eliminate the hazards or to lower employees' exposures to safe levels.

This three-step process, summarized below, is called a hazard analysis or hazard evaluation.

1. Identify the respiratory hazards in your workplace

- Consider the sources of respiratory hazards such as production processes, work tasks, raw materials, and end products. What raw materials are used in a production process? What are the intermediate products and the byproducts of each process? Do employees use equipment or handle substances that could expose them to respiratory hazards?

- Review safety data sheets and chemical inventories to identify chemicals that may expose employees to respiratory hazards.

- Talk to employees. Do they have safety or health concerns about certain products, materials, or machines? Have they reported signs or symptoms of respiratory conditions?

2. Evaluate employees' exposures to each hazard

After respiratory hazards have been identified, evaluate employees' exposures to determine whether they are exposed at unsafe levels. Evaluate exposures by measuring them or estimate them with data from previous exposure measurements. Three examples:

- Measure the exposures of individual employees by sampling their breathing air. The procedure – called **personal exposure monitoring** – is the most accurate way to evaluate exposure levels.

- 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's source.

- Use representative exposure data from industry studies, trade associations, or product manufacturers to estimate exposures. You must be able to show that the data are based on conditions similar to those that exist in your workplace.

- Immediately dangerous to life and health (IDLH) refers to an atmospheric concentration of a toxic, corrosive, or asphyxiant substance that poses an immediate threat to life, causes irreversible health effects, or interferes with one's ability to escape from a dangerous atmosphere. If employees may be exposed to such substances and you're unable to evaluate their exposures, you must consider the exposure IDLH.

About exposure monitoring

Exposure monitoring is the testing of air samples to determine the concentration of contaminants in a work environment. Test data from the samples are averaged over a period of time, usually eight hours, and referred to as a time-weighted average (TWA).

Oregon OSHA has established permissible exposure limits (PEL) for specific air contaminates. Exposures must not exceed the PEL-TWA in any eight-hour work shift.

PELs are listed in 437-002-0382, Oregon Rules for Air Contaminants, and in other Oregon OSHA rules for specific hazardous substances.

A trained specialist, such as an industrial hygienist, can help you evaluate employee exposures, interpret the results, and suggest how to lower exposures to safe levels.

3. Eliminate respiratory hazards or lower employees' exposures to safe levels

If employees are exposed to respiratory hazards at unsafe levels, you'll need to determine how to protect them from overexposure. For example, is there a way to eliminate the hazard — by using another production process or materials that aren't hazardous?

If you can't eliminate a respiratory hazard, try engineering controls to lower exposures. Examples of engineering controls are physically isolating a production process so that the employees are not exposed and installing an exhaust hood to remove air contaminants.

Employees can use respirators for protection from respiratory hazards only when engineering controls are not feasible or will not reduce their exposures to safe levels.

Need help identifying respiratory hazards, evaluating exposures, or using appropriate engineering controls? Contact your workers' compensation insurance carrier or an Oregon OSHA consultant.

Half-mask
air-purifying respirator

About respirators

A respirator protects against respiratory hazards by removing specific air contaminants from the surrounding air or by supplying breathable air from a safe source. Respirators that remove contaminants from the ambient air are called air-purifying respirators. Respirators that supply air from a safe source other than the ambient air are called atmosphere-supplying respirators.

The part of a respirator that forms a protective barrier between the user's respiratory tract and air contaminants is called an inlet covering. Inlet coverings can be classified as either tight-fitting or loose-fitting.

A tight-fitting inlet covering forms a complete seal on the user's face. The facepiece is usually made of a molded flexible elastomer — an elastic substance that resembles rubber — and is available in quarter-mask, half-mask, and full-facepiece types.
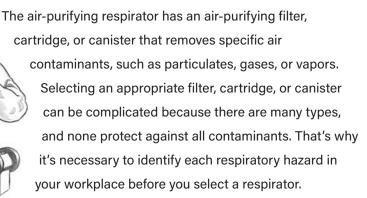
Full-facepiece
air-purifying respirator

A loose-fitting inlet covering, such as a hood, typically covers the user's head and may extend over the shoulders. A flexible tube usually supplies breathable air to the covering. Loose-fitting coverings can be used only with atmosphere-supplying respirators or powered air-purifying respirators.

Effective respiratory protection ensures that workers are medically able to use respirators, that their respirators fit properly, and that they know how to use and care for their respirators.

Air-purifying respirators

The air-purifying respirator has an air-purifying filter, cartridge, or canister that removes specific air contaminants, such as particulates, gases, or vapors. Selecting an appropriate filter, cartridge, or canister can be complicated because there are many types, and none protect against all contaminants. That's why it's necessary to identify each respiratory hazard in your workplace before you select a respirator.

Air-purifying respirators are available in nonpowered and powered types. The user operates the nonpowered

Full-facepiece powered
air-purifying respirator

type simply by breathing. A powered air-purifying respirator has a blower that forces ambient air through one or more filters attached to an inlet covering. The powered type is easier to breathe through than the nonpowered type but needs a fully charged battery to work properly. Nonpowered and powered air-purifying respirators can remove particles, gas and vapor, or both.

Are dust masks respirators?

Only dust masks certified by the National Institute for Occupational Safety and Health (NIOSH) are approved for use as respirators. A NIOSH-certified dust mask – called a filtering facepiece – is a tight-fitting, negative pressure, particulate respirator. The filter is the facepiece. They will have a designation of N, R, or P, with the number 95, 99, or 100.

Filtering facepiece

Atmosphere-supplying respirators

An atmosphere-supplying respirator supplies the user with breathable air from a source other than the ambient air, so filters are not necessary. There are three types of atmosphere-supplying respirators:

- Supplied-air respirator. The supplied-air respirator supplies breathable air from a stationary source, such as a compressor, separated from the user. Breathable air is supplied to the inlet covering of the respirator through a flexible hose.

- Self-contained breathing apparatus (SCBA). As its name implies, this respirator isn't connected to a stationary source of breathable air. The user carries the air supply.

- Combination supplied-air with auxiliary SCBA. This respirator is generally used to escape from a hazardous atmosphere.

You'll also find references to demand respirators and pressure-demand respirators in 1910.134. A demand respirator admits breathing air to a facepiece only when the user inhales, creating a negative pressure inside the facepiece. A pressure-demand respirator is similar, except it has an air-flow-regulating valve that maintains a positive pressure inside the facepiece during inhalation and exhalation.

All atmosphere-supplying respirators protect users from toxic particulates, gases and vapors, and oxygen-deficient atmospheres. Each type serves a specific purpose. Before you select an atmosphere-supplying respirator, know the respiratory hazards a user will encounter, the user's exposure levels, and what the user will be doing while wearing the respirator.

The following page summarizes common air-purifying and atmosphere-supplying respirators.

Supplied-air respirator (SAR)

Self-contained breathing apparatus (SCBA)

Combination supplied-air with auxiliary SCBA

Types of respirators

Air-purifying respirators

Particulate-removing respirator

Also called an aerosol-removing respirator. Protects against particulates such as dusts, mists, and fumes. Does not protect against gases, vapors, or oxygen deficiency. Equipped with permanent or replaceable filters that remove particulates from the air.

Three filter types are available: N-series protects against solid and water-based particulates such as nuisance dust; R-series protects against any particulates, including oil-based materials. Workers may generally use these filters for one eight-hour shift if oil aerosols are present. P-series filters protect against any particulates, including oil-based materials, without a time limit for users. Each filter is available in three levels of efficiency: 95, 99, and 100. The 100 level is the current rating for what was called the HEPA (high efficiency particulate air) filter.

Gas-and-vapor-removing respirator

Protects against specific gases and vapors. Equipped with cartridges or canisters containing sorbents that remove specific air contaminants. Sorbents are granular, porous materials that purify inhaled air; activated carbon from coconut shells are often used as sorbent material. Sorbents eventually break down and must be replaced before the respirator user detects a chemical smell, taste, or irritation.

Combination aerosol filter/gas or vapor-removing respirator

Combines a particle-removing filter with a chemical cartridge or canister for removing specific gases or vapors.

Powered air-purifying respirator

Uses a powered blower to move air through a filter, chemical cartridge, or canister that removes the contaminants. The purified air then passes through

the respirator inlet covering to the wearer. Generally, these respirators can maintain a positive pressure within the inlet covering, reducing the chance of contaminants leaking into the facepiece.

Atmosphere-supplying respirators

Supplied-air respirator

Supplies breathing air through a hose connected to the user's facepiece or a head enclosure and to an independent compressor or compressed air cylinder; the user doesn't carry the air supply. If the air supply fails, the user may have to remove the respirator to leave the work area. For this reason, supplied-air respirators should be used only in non-IDLH atmospheres or in environments in which the user can escape without a respirator.

Self-contained breathing apparatus (SCBA)

Protects the user in non-IDLH and IDLH atmospheres because the user carries the breathing air. There are two types of self-contained breathing apparatus: closed-circuit SCBA and open-circuit SCBA. Closed-circuit SCBAs recycle the user's breathing air, and open-circuit SCBAs release exhaled air into the surrounding environment. Each type has advantages and disadvantages in terms of weight, duration of use, complexity, and cost.

Combination scuba and air-line respirator

Combines a supplied-air respirator with an auxiliary self-contained air supply. Can be used in IDLH atmospheres. Allows the user to switch to the auxiliary self-contained air supply if the supplied-air respirator fails. Useful for extended work in hazardous atmospheres such as confined spaces.

Combination air-purifying and atmosphere-supplying respirators

Combines a supplied-air respirator with an auxiliary air-purifying attachment that protects the user if the supplied-air respirator fails. Can be used in an air-purifying or an atmosphere-supplying mode. Can only be used in atmospheres for which the air-purifying element is approved and can't be used in IDLH atmospheres.

Table 1: Assigned Protection Factors

Federal OSHA has developed assigned protection factors (APF) to assist you in deciding which respirator is appropriate for the airborne hazards to which employees are exposed. Multiply the APF numbers in the table below by the PELs of the chemicals of concern, and that will tell you the maximum exposure levels the respirators can protect against.

The half-mask category includes filtering facepieces.

For helmets and hoods, you can only use the factor of 1,000 when the manufacturer certifies that it performs at that level. Otherwise, you can only use the factor of 25. None of these fit factors apply to escape respirators.

Type of respirator	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
1. Air-purifying respirator	5	10	50	—	—
2. Powered air-purifying respirator (PAPR)	—	50	1,000	25/1,000	25
3. Supplied-air respirator (SAR) or airline respirator					
▪ Demand mode	—	10	50	—	—
▪ Continuous flow mode	—	50	1,000	25	25

Type of respirator	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
• Pressure-demand or other positive-pressure modes	—	50	1,000	—	—
4. Self-contained breathing apparatus (SCBA)					
• Demand mode	—	10	50	50	—
• Pressure-demand or other positive-pressure modes (e.g., open/ closed circuit)	—	—	10,000	10,000	—

Developing your respiratory protection program

If respirators are necessary to protect your employees, you must have a written program that describes how you will:

● Appoint an administrator to implement your respiratory protection program

● Develop procedures for selecting respirators

● Provide medical evaluations for employees who use respirators

- Fit test employees who use respirators with tight-fitting facepieces
- Develop procedures for using respirators during regular activities and during emergencies
- Provide employees who use respirators voluntarily with the information in 1910.134, Appendix D
- Train employees who you require to use respirators
- Make sure respirators are clean, sanitary, and properly maintained
- Identify respirator filters, cartridges, and canisters
- Use high-quality breathing air for atmosphere-supplying respirators
- Keep records of medical evaluations and fit-testing results
- Evaluate your program to make sure it's effective

An effective program ensures that employees are medically able to use respirators, that their respirators fit properly, and that they know how to use and care for them. You can develop an effective program by following the steps described in this section.

Appoint an administrator to implement your respiratory protection program

The administrator is responsible for developing, managing, and evaluating your respiratory protection program. The administrator can delegate parts of the program to other qualified employees — such as respirator fit testing and maintenance — but must oversee their activities.

What training does the administrator need?

1910.134 doesn't specify qualifications for the administrator, but says the administrator must have "appropriate training that is commensurate with the complexity of the program." Your program administrator must know how to identify, evaluate, and control the respiratory hazards at your workplace.

An example

A workplace has three employees who ocassionally sand and grind during the workday and are exposed to wood dust. Due to the nature of their work, dust-control devices aren't effective, and the employees must use air-purifying respirators for protection. The program administrator must develop an appropriate respirator program for the workplace — a fairly easy job because only three employees are exposed to a minor hazard, and they can be protected with relatively simple respirators.

However, if the employees did a variety of tasks that exposed them to toxic chemicals, biological hazards, and oxygen-deficient atmospheres, the administrator would need to know how to protect the employees from all of the hazards — a job for a trained safety professional.

When does the administrator need to implement the respiratory protection program?

All parts of the program must be in effect before any employee uses a respirator.

Develop procedures for selecting respirators

Only when respiratory hazards can't be eliminated should you consider protecting employees with respirators. If respirators are necessary, you must ensure they are appropriate for the tasks the employees perform and that they fit the employees. Remember, before you select respirators, you need to identify the respiratory hazards in your workplace and evaluate employees' exposure levels.

Selecting respirators for atmospheres that aren't immediately dangerous to life or health

Those who work in atmospheres that aren't immediately dangerous to their life or health can use air-purifying respirators or atmosphere-supplying respirators. Recall that air-purifying respirators have an air-purifying filter, cartridge,

or canister that removes specific air contaminants. Atmosphere-supplying respirators provide breathable air from a source other than the ambient atmosphere. Table 2 below summarizes the options.

Critical steps for selecting respirators

1. Identify the respiratory hazards; include the hazard's chemical name and physical form.

2. Evaluate employee exposure levels to determine air concentration of the hazards; personal exposure monitoring is the most accurate method.

3. Determine the oxygen concentration of the atmosphere; oxygen concentrations less than 19.5 percent are considered immediately dangerous to life and health (IDLH).

4. Select respirators based on the hazard's air concentration, chemical and physical form, and the availability of oxygen.

5. Use only NIOSH-certified respirators.

Table 2: Respirators for atmospheres that aren't immediately dangerous to life or health		
Respirator	**For particulate protection**	**For gas and vapor protection**
Air-purifying	The respirator must be certified by NIOSH for protection against particulates under 42 CFR Part 84 (the NIOSH certification program for respirators). Select a respirator based on an employee's exposure, severity of the inhalation hazard, air-particulate concentration, and the availability of oxygen.	The respirator must have an end-of-service-life indicator or your workplace must have an effective change schedule for appropriate canisters and cartridges. Select a respirator based on the hazard's chemical composition, physical state, air-contaminant concentration, and the availability of oxygen.

Respirator	For particulate protection	For gas and vapor protection
Atmosphere-supplying	Select a respirator based on an employee's exposure, severity of the inhalation hazard, air-particulate concentration, and the availability of oxygen.	Select a respirator based on the hazard's chemical composition, physical state, air-contaminant concentration, and the availability of oxygen.

Selecting respirators: narrowing the options

You've given me general information for selecting respirators, but how do I select specific respirators for my employees?

Most respirator suppliers and manufacturers will help you select appropriate respirators. Federal OSHA includes an easy-to-use compliance assistance "e-tool" for selecting specific respirators on its website at osha.gov/etools/respiratory-protection. You can also get help from your workers' compensation insurance carrier and from Oregon OSHA if you request a consultation.

Conducting the medical evaluation:

- The employee must be able to complete the medical-evaluation questionnaire at a convenient time and place.

- The employee must understand the questions on the medical-evaluation questionnaire. You can also download the questionnaire in Spanish from the Oregon OSHA website: osha.oregon.gov.

- The employee has the right to discuss the questionnaire and the results of their evaluation with the physician or other licensed health care professional (PLHCP).

- The employee's responses on the questionnaire and information revealed during the medical evaluation are confidential — only the employee and the PLHCP may know them.

Provide medical evaluations for employees who use respirators

Before employees use respirators, they must have confidential medical evaluations to ensure that their safety or health will not be at risk. A physician or other licensed health-care professional (PLHCP) must do the evaluation at no cost to the employee. The evaluation must be based on the questionnaire in Part A of Appendix C to 1910.134. The PLHCP can examine the employee or evaluate the employee's written responses to the questionnaire in Appendix C, but the determination must be based on information obtained from answers to the questionnaire.

You must also provide the PLHCP with the following information for the evaluation:

- The type and weight of respirator the employee will use
- How long and how frequently the employee will use the respirator
- How much physical work the employee will do while using the respirator
- Other personal protective equipment the employee will use
- The temperature and humidity of the working environment
- A copy of your respirator program and a copy of 1910.134

Follow-up evaluations

A follow-up medical evaluation is required for the following reasons:

- The employee reports medical signs or symptoms related to respirator use.
- The PLHCP, a supervisor, or the program administrator recommends a re-evaluation.
- Fit test or other program information indicates a need for re-evaluation.
- When changes in the workplace increase respiratory stress on an employee.

The PLHCP's medical determination

Make sure the PLHCP sends you a written determination of the medical evaluation results, because an employee can't use a respirator until you receive one. The determination will tell you the following:

- Whether the employee is medically able to use a respirator
- Any restrictions on the employee's use of the respirator
- The need for follow-up medical evaluations
- Verification that the PLHCP has given the employee a copy of the written determination

Who makes the final determination?

Employers are responsible for making the final decision about an employee's ability to use a respirator. The PLHCP's medical determination is an important factor in making the decision.

Keep the PLHCP's written determination in the employee's confidential file. All other information regarding the medical evaluation is strictly confidential and is restricted to the employee and the PLHCP.

If properly selected and used, respirators protect workers from hazards, but don't eliminate hazards. If the respirator fails or is inappropriate for a particular task, the user risks exposure. A respirator can also stress a worker's heart and lungs. Breathing through a tight-fitting air-purifying respirator, for example, is harder than breathing ambient air, and an atmosphere-supplying self-contained breathing apparatus can increase the user's heart rate because of its weight.

Those with lung disease, asthma, or trouble breathing should not use a respirator without the approval of a PLHCP. Those who have vision problems or who are claustrophobic may also be unable to use some respirators.

Fit test employees who use respirators with tight-fitting facepieces

To protect an employee, a tight-fitting facepiece needs to fit so the face-to-facepiece seal doesn't leak. Loose-fitting respirators, such as PAPRs with a hood, cannot be fit tested.

Employers must fit test employees who are required to wear tight-fitting respirators. Employers are not required to fit test employees who use loose-fitting respirators, such as powered air-purifying respirators with a hood.

A fit test protocol from Appendix A of 1910.134 must be used. There are two general types of methods, the **qualitative fit test (QLFT)** and the **quantitative fit test (QNFT)**. There are several acceptable protocols or procedures for each method.

The QLFT relies on the respirator user's response to a test agent. When used

with negative-pressure, air-purifying respirators, it may only be used to fit test respirators that must achieve a fit factor of 100 or less (up to 10 times the PEL).

The QNFT depends on a piece of equipment that samples the concentration of a test agent inside and outside the user's facepiece, to calculate how well the facepiece fits. This method is more accurate, but is also more expensive than the QLFT method. The QNFT must achieve a fit factor of at least 100 for a tight-fitting half mask respirator, and at least 500 for a tight-fitting full facepiece respirator.

The fit factor is the ratio of the concentration of a contaminant outside the facepiece to the concentration inside the facepiece. It is a measure of how well a respirator protects the employee.

Employees who use respirators with tight-fitting facepieces must be fit tested with a respirator of the same make, model, style, and size. They must be tested annually and whenever they change facepiece models, styles, or sizes, or if they have a physical change that affects the facepiece-to-face seal.

Those who report that their respirators don't fit properly can select another tight-fitting facepiece, however, the replacement must also be fit tested. Those who fail a fit test must select another facepiece and be tested again.

Develop procedures for using respirators during regular activities and during emergencies

Your respiratory protection program must have written procedures to ensure that employees will use their respirators properly during their routine jobs and during emergencies. Those procedures must accomplish the following:

- Prevent conditions that could cause a tight-fitting facepiece to leak.
- Ensure that employees leave work areas before removing their respirators.
- Ensure that employees' respirators operate effectively throughout their work shifts.
- Protect employees who enter IDLH environments or do interior structural firefighting.

Prevent conditions that could cause a tight-fitting facepiece to leak

Employees can't use respirators with tight-fitting facepieces if they have facial hair or anything else – including eyeglasses or personal protective equipment – that interferes with the sealing surface of the respirator or with the valve function.

Employees must also perform a seal check – a simple procedure that determines if a respirator has an effective face-to-facepiece seal – each time

How to check the seal of tight-fitting respirators

You can use either of the following methods.

Positive-pressure check:

1. Block the exhalation valve cover with the palm of your hand.

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

3. If you can feel air leaking under the facepiece, reposition the facepiece and repeat steps 1 and 2 until you have an effective seal.

Negative-pressure check:

1. Cover the inlet openings of the cartridges or canisters with palms of your hands and inhale gently so that the facepiece collapses.

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

3. If the facepiece expands or you can feel air leaking under the facepiece, reposition it and repeat steps 1 and 2.

they put on a tight-fitting respirator. They must follow the procedure in 1910.134, Appendix B-1 or the respirator manufacturer's instructions.

Remember that a seal check is different than a fit test, which is a method for determining that a facepiece fits the user correctly.

Ensure employees leave the work area before removing their respirators

When employees use respirators, they must leave their work areas for the following reasons to avoid potential exposure:

- To wash their faces or their respirator facepieces
- When they detect vapor or gas, changes in breathing resistance, or leakage of the facepiece
- To replace the respirator or the filter, cartridge, or canister elements

If a respirator isn't working properly, it must be replaced or repaired before the employee returns to the work area.

Ensure that respirators operate effectively throughout the work shift

Employees must be protected from respiratory hazards regardless of their tasks or work environments. Respirators should remain comfortable and must work effectively with other personal protective equipment.

Protect employees who enter IDLH environments or do interior structural firefighting

Anyone who works in an IDLH environment must use a full-facepiece, pressure-demand, self-contained breathing apparatus (SCBA) or a combination full-facepiece, pressure-demand, supplied-air respirator with auxiliary self-contained air supply.

At least one trained rescue person must stay outside the IDLH atmosphere to respond to emergencies. That person must have a positive-pressure SCBA or supplied-air respirator with auxiliary SCBA and rescue retrieval equipment.

Those who fight interior structural fires must have at least one other person with them, and at least two rescuers must wait for them in a safe area.

Provide employees who use respirators voluntarily with the information in 1910.134, Appendix D

When it's not necessary for employees to use respirators, they can use them voluntarily, provided you permit them to do so and their health or safety isn't affected. Medical evaluation is required for the use of all respirators, with the exception of filtering facepiece respirators used voluntarily. Note that fit testing is not required for voluntary use of any type of respirator. Providing information to employees from Appendix D of the Respiratory Protection standard is required for all types, as is following a schedule to clean, inspect, maintain, and store respirators. You can provide the employee with the information in written or verbal form. Table 3 summarizes the requirements:

Table 3: Respiratory protection – voluntary use				
1910.134 Respiratory protection requirement	Filtering facepiece (dust mask)	Elastomeric negative-pressure respirator	Powered-air purifying	Supplied-air respirator
Written respiratory program	No	Yes	Yes	Yes
Medical evaluation	No	Yes	Yes	Yes
Fit testing	No	No	No	No
Annual training	No	No	No	No
Appendix D	Yes	Yes	Yes	Yes
Clean, inspect, maintain, store	Yes	Yes	Yes	Yes

Train employees who you require to use respirators

If you require employees to use respirators, they must be trained before they use them for the first time. You can choose the trainer and determine the training format; however, the training content must include the following:

- Why the respirators are required
- Why respirators must fit correctly and be properly maintained
- The capabilities and limitations of the respirators
- How to use the respirators in emergencies and how to respond if the respirator fails
- How to inspect, maintain, and store the respirators
- How to seal-check tight-fitting facepieces
- Medical symptoms, such as dizziness or shortness of breath, that may limit the effectiveness of the respirators
- The general requirements of your respiratory protection program

New employees who have been trained in these elements within the past 12 months — by a former employer, for example — and who can show that they are knowledgeable about the topics are exempt from initial training.

Retraining is required at least annually — sooner if respiratory hazards change or if employees switch to another type of respirator.

Make sure respirators are clean, sanitary, and properly maintained

Employees' respirators must be clean and in good working order. They can clean and maintain their equipment or you can have it serviced for them. Those who do the cleaning and maintenance must be properly trained.

- Any respirator shared with a co-worker must be cleaned and disinfected before the co-worker uses it.
- A respirator must be inspected for damage before it's used and whenever it's cleaned. The facepiece must fit correctly and all parts must be in good working order. Defective respirators must be discarded or repaired by an appropriately trained person.
- Respirators used for emergencies must be inspected at least monthly. Document each inspection date.
- Employees must store their respirators so that the facepieces and valves are not deformed, and in a place free from dust, sunlight, extreme temperatures, and moisture.

Table 4: Schedule for cleaning, inspecting, and storing respirators

Situation/ use	Cleaning and disinfecting	Inspecting	Storage
Personal use	Clean and disinfect as often as necessary to keep sanitary.	Inspect before each use and during cleaning.	Store free from contamination/ ensure that valves and facepieces aren't deformed.
Multiple users	Clean and disinfect before another worker uses it.	Inspect before each use and during cleaning.	Store free from contamination/ ensure that valves and facepieces aren't deformed.
Emergency use	Clean and disinfect after each use.	Inspect at least monthly and in accordance with manufacturers' recommendations. Inspect escape-only respirators before using them in the workplace. Identify for emergency use only.	Keep readily accessible. Store free from contamination/ ensure that valves and facepieces aren't deformed.
Training and fit testing	Clean and disinfect after each use.	Inspect before each use and during cleaning.	Store free from contamination/ ensure that valves and facepieces aren't deformed.

Note: Appendix B-2, 1910.134 includes the correct procedure for cleaning respirators.

Identify respirator filters, cartridges, and canisters

Make sure that each respirator filter, cartridge, and canister has a NIOSH-approval label. Keep the label legible; don't remove or deface it. The color-coded label identifies the protection provided by the respirator and informs a user that the respirator has an appropriate filter. Color coding helps users select the correct filters for their respirators.

Example of a NIOSH-approval label

National Institute for
Occupational Safety and Health
NIOSH®

Respirator Manufacturing Company
Anytown, Anystate, USA
1-800-123-4567

This respirator is approved only in the following configuration:

TC-	Protection[1]	Respirator			Cautions and Limitations[2]
		1000S	1000M	1000L	
TC-84A-0000	N95	X	X	X	ABCJMNOP

1. Protection

N95 - Particulate Filter (95% filter efficiency level).
Effective against particulate aerosols free of oil; time use restrictions may apply.

2. Cautions and Limitations

A   Not for use in atmospheres containing less than 19.5% oxygen.
B   Not for use in atmospheres immediately dangerous to life or health.
C   Do not exceed maximum use concentrations established by regulatory standards.
J   Failure to properly use and maintain this product could result in injury or death.
M   All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.
N   Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer.
O   Refer to User Instructions and/or maintenance manuals for information on use and maintenance of these respirators.
P   NIOSH does not evaluate respirators for use as surgical masks.

Use high-quality breathing air for atmosphere-supplying respirators

Compressed air, compressed oxygen, liquid air, and liquid oxygen used for breathing air must meet specific standards, described below. You can rely on certificates of analysis from suppliers to ensure that breathing air is high quality. If you produce breathing air from a compressor, you must follow specific requirements [see 1910.134(i)(5)-(7)] for the location of the compressor, moisture content of ambient air, carbon monoxide level, and filter change dates.

- Compressed and liquid oxygen used for breathing must meet standards set by the United States Pharmacopeia (U.S.P.)

- Compressed air must meet the Type 1-Grade D breathing air requirements described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989.

- Compressed oxygen can't be used in atmosphere-supplying respirators that have previously used compressed air.

- Oxygen concentrations greater than 23.5 percent must be used only in equipment designed specifically for oxygen service and distribution.

- Cylinders that supply breathing air must meet specific maintenance, air quality, and moisture content requirements.

- Compressors must meet specific requirements for air quality, moisture content, and carbon monoxide level, and must display a tag showing the most recent sorbent bed and filter change date.

- Breathing-air couplings must not fit outlets for nonbreathable air.

- Breathing-gas containers must be marked in accordance with the NIOSH certification program for respirators, 42 CFR Part 84.

Keep records of medical evaluations and fit testing results

Maintain a file of your employees' medical evaluations and fit test results and keep a current copy of your respiratory protection program. Each fit-test record

must identify the fit test method; the respirator make, model, and size; the test date; the test results; and the name of the employee tested. Employees may review only their own medical evaluation and fit-test records.

- Keep medical evaluation records for 30 years. Medical records of those who work less than one year need not be retained if they are given to employees upon termination. (For more information, see 1910.1020, Access to employee exposure and medical records.)
- Keep fit test records for respirator users until their next fit tests.

Evaluate your program to make sure it's effective

Periodically review each of the written elements of your respirator program:

- Procedures for selecting respirators
- Provisions for medical evaluations
- Fit testing procedures
- Procedures for using respirators during regular activities and during emergencies
- Procedures for maintaining respirators
- Procedures for ensuring air quality in atmosphere-supplying respirators
- Provisions for training employees about respiratory protection

You don't need to do evaluations on a fixed schedule — do them frequently enough to keep the program current and to ensure that written procedures are effective.

Observing how employees use their respirators and listening to their concerns are also important in evaluating the program. Do employees use and maintain their respirators correctly? Do their respirators fit? Are their respirators appropriate for their work tasks and environments? Do they have concerns about the program?

Evaluate the written elements to ensure they're effective; update or change them, if necessary.

Notes

Oregon OSHA Services

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

Appeals

▶ **503-947-7426; 800-922-2689; admin.web@dcbs.oregon.gov**

- 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.

Conferences

▶ **503-378-3272; 888-292-5247, Option 1; oregon.conferences@dcbs.oregon.gov**

- Co-hosts conferences throughout Oregon that enable employees and employers to learn and share ideas with local and nationally recognized safety and health professionals.

Consultative Services

▶ **503-378-3272; 800-922-2689; consult.web@dcbs.oregon.gov**

- 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

▶ **503-378-3272; 800-922-2689; enforce.web@dcbs.oregon.gov**

- 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.

Public Education

▶ **503-947-7443; 888-292-5247, Option 2; ed.web@dcbs.oregon.gov**

- Provides workshops and materials covering management of basic safety and health programs, safety committees, accident investigation, technical topics, and job safety analysis.

Standards and Technical Resources

▶ **503-378-3272; 800-922-2689; tech.web@dcbs.oregon.gov**

- Develops, interprets, and gives technical advice on Oregon OSHA's safety and health rules.
- Publishes safe-practices guides, pamphlets, and other materials for employers and employees.
- Manages the Oregon OSHA Resource Center, which offers safety videos, books, periodicals, and research assistance for employers and employees.

Need more information?
Call your nearest Oregon OSHA office.

Salem Central Office

350 Winter St. NE
Salem, OR 97301-3882

Phone: 503-378-3272
Toll-free: 800-922-2689

Fax: 503-947-7461
en Español: 800-843-8086
Website: osha.oregon.gov

Bend

Red Oaks Square
1230 NE Third St., Suite A-115
Bend, OR 97701-4374
541-388-6066
Consultation: 541-388-6068

Eugene

1500 Valley River Drive, Suite 150
Eugene, OR 97401-4643
541-686-7562
Consultation: 541-686-7913

Medford

1840 Barnett Road, Suite D
Medford, OR 97504-8293
541-776-6030
Consultation: 541-776-6016

Pendleton

200 SE Hailey Ave.
Pendleton, OR 97801-3072
541-276-9175
Consultation: 541-276-2353

Portland

Durham Plaza
16760 SW Upper Boones
Ferry Road, Suite 200
Tigard, OR 97224-7696
503-229-5910
Consultation: 503-229-6193

Salem

1340 Tandem Ave. NE, Suite 160
Salem, OR 97301-8080
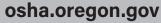503-378-3274
Consultation: 503-373-7819

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Department of Consumer
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