



Respiratory Protection

Safety Training

Session Objectives

At the end of this course, you should be aware of the requirements for:

- Written respiratory protection program
- Selection and types of respirators
- Medical evaluations and fit testing
- Use, maintenance, and care for respirators
- Training employees
- Program evaluation
- Recordkeeping

Someone in Charge

- Written program must be implemented by a trained program administrator
 - Must be qualified
 - Know the hazards in the workplace and if engineering controls can be applied
 - Identify types of respirators to be used if engineering controls will not work
- Update as necessary



Why Have Medical Evaluations?

- A respirator places a physiological burden on the employee
- This burden varies with:
 - Type of respirator worn
 - Job and workplace conditions
 - Medical status of the employee



Physiological Effects

- Pulmonary
- Cardiovascular
- Body temperature
- Senses
- Psychological
- Irritation and allergy



Medical Evaluation

- Establishes the medical condition of the wearer
- Provided before initial respirator use
- Prior to fit testing and training
- Performed by a physician or other licensed health care professional
 - OSHA Respirator Medical Evaluation Questionnaire; Appendix C or
 - Initial medical examination

Follow Up Medical Examinations

Required if:

- Positive response to questions 1 – 8 in Section 2, Part A of Appendix C
- Initial medical examination indicates need for follow-up physical

Must include any medical tests, consultations, or diagnostic procedures a physician or other licensed health care professional deems necessary



Hazard Determination

- Identify the contaminants and evaluate the hazards
- Determine the physical properties of the contaminants
- Identify areas of potential oxygen deficiency
- Estimate or measure employee's exposure to the hazards
 - Assume Immediately Dangerous to Life or Health (IDLH), when not known

Hazards Requiring Respirator Use

- Oxygen-deficient atmosphere
 - Does not contain enough oxygen to sustain breathing. (<19.5 percent by volume at sea level) These include:
 - Confined spaces
 - Silos
 - Boilers
 - Tanks
 - Sewers
 - Immediately dangerous to life or health or unknown atmosphere



Hazards Requiring Respirator Use

Chemical Hazards

- Overexposure to workplace contaminants such as: dust, spray, fumes, vapors, smoke, harmful gases

Biological Hazards

- Exposure to organisms such as bacteria, viruses, fungi, and other living organisms. (These organisms do not have exposure limits)

Hierarchy of Controls

- Engineering controls
 - Ventilation
- Administrative/work practice controls
 - Rotating employees to reduce exposure time
 - Limiting the time someone can work in an area
 - Changing the way the work process is conducted
- Personal protective equipment (PPE)
 - Used when unable to eliminate or reduce the hazard sufficiently



Selection

- Select the appropriate respirator based on the hazard, workplace, and user factors
- Select only The National Institute for Occupational Safety and Health (NIOSH)-certified respirators
- Provide enough respirator models and sizes to correctly fit user

Interior Structural Firefighting

- At least two employees enter IDLH atmosphere (two-in)
- Must remain in visual or voice contact with one another
- At least two employees remain outside IDLH atmosphere (two-out)
- Must use pressure demand Self-Contained Breathing Apparatus (SCBA)
- Does not preclude emergency rescue of human beings before entire team assembles

What is a respirator?

- A device that protects workers by purifying air or by providing an air supply (O₂ deficiency or IDLH conditions)
- Two main types of respirators:
 - Air-purifying respirators remove contaminants from breathing air through a filter, cartridge, or canister
 - Supplied-air respirators provide clean air from an uncontaminated source such as bottle or compressor



Breathing Air Use

- Compressors
 - If oil lubricated
 - CO alarm, high temperature alarm or both
 - If only high temperature alarm, must monitor for CO at sufficient intervals
 - If non-oil lubricated
 - Employer shall ensure that the CO level is < 10 ppm
 - Breathing air couplings must be incompatible with those for non-respirable air or other gas systems

Air-Purifying Respirators (APR)



Filtering Facepiece



Half Mask Respirator



Full Facepiece Respirator

Filtering Facepiece (Dust Mask)

- Negative pressure particulate respirator with entire or majority of face piece composed of a filtering medium
- Captures particles in the air, such as dusts, aerosols, mists, and fumes
- Filters will be labeled with a letter N, R or P and number representing the efficiency: 95, 99 or 100
- Does not protect against gases or vapors
- Replace filters when the user finds it difficult to breathe



Respirators with Combination Cartridges

Full Facepiece and Half Mask

- Used in atmospheres that contain both particulates and gases or vapors
 - Have both particulate filters and gas/vapor cartridges or canisters
 - Not for use in oxygen-deficient atmospheres or atmospheres which have high concentrations of contaminants (such as IDLH)
 - Breathing may become difficult because of the additional effort required to draw air through the purifying medium
-

Respirators with Organic Vapor Cartridges

Full Facepiece and Half Mask

- Does not protect against airborne particles
- Provides protection only as long as the filter's absorbing capacity is not depleted
- Uses chemical filters (called cartridges or canisters) to remove specific dangerous gases or vapors
- Service life of the filter depends upon many factors and can be estimated in various ways

Powered-Air Purifying Respirator (PAPR)

- An air-purifying respirator with a blower to force the ambient air through air-purifying elements to the inlet covering
- Can be a full and half-mask facepiece, helmet or hood
- Use restricted to battery life and the fan and pack must be always carried by the wearer
- Cannot be used in oxygen deficient or IDLH atmospheres



Cartridge/Canister Service Life

- Conditions affecting service life
 - Exertion level
 - Cartridge variability
 - Temperature
 - Humidity
 - Multiple contaminants

Filters/Cartridges/Canister Labels

- Only NIOSH approved
- Labeled and color coded
- Label shall not be removed and remains legible



Training and Information

REQUIRED:

- Prior to requiring the employee to use a respirator
- Annually
- When changes in workplace render previous training obsolete
- Employee use demonstrates inadequate training
- Any other situation arises in which retraining appears necessary

Training and Information

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
- Limitations and capabilities of the respirator.
- How to effectively use the respirator in emergencies.
- General requirements of the standard



Training and Information

- How to inspect, don, doff, use, perform seal checks.
- Maintenance and storage procedures.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirator

When is Fit Testing Required?

- Before initial use
- Annually, thereafter
- When facial features change, such as with weight gain or loss, use of dentures
- Note: Employees wearing tight-fitting face-pieces must not be fit tested if they have facial hair *



Qualitative Fit Test (QLFT)

- A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.
- Must not be used if a person has no sense of taste or smell.
- Used for respirators requiring a fit factor of 100 or less.



Qualitative Fit Test (QLFT)

- An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator (Fit Factor).
- Can be used for any type of respirator.
- Must be used for respirators requiring a fit factor of 500 or greater*.

Cleaning and Disinfecting

- Respirators must be clean, sanitary, and in good working order.
- Respirators must be cleaned and disinfected using the procedures in Appendix B-2 or procedures recommended by the respirator manufacturer

Cleaning and Disinfecting

- Respirators cleaned and disinfected at the following intervals:
 - If exclusive use by employee – as often as necessary to be maintained in a sanitary condition.
 - If shared by employees – prior to each use by different employee.
 - If for emergency use – after each use.
 - If used for training and fit testing – between each employee and at the end of each training/fit testing session.

Storage

Respirators must be protected from:

- Dust
- Sunlight
- Heat
- Cold
- Moisture
- Chemicals

Must be stored in a sealed container or bag

Inspection

Check for:

- Holes in the filters
- Loss of elasticity or tears in the head straps and hoses
- Broken or loose connectors and fittings
- Cracked or scratched face pieces
- Detergent residue
- Dirt in the valves
- General cleanliness



Inspection

Respirators maintained for emergency use must be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use



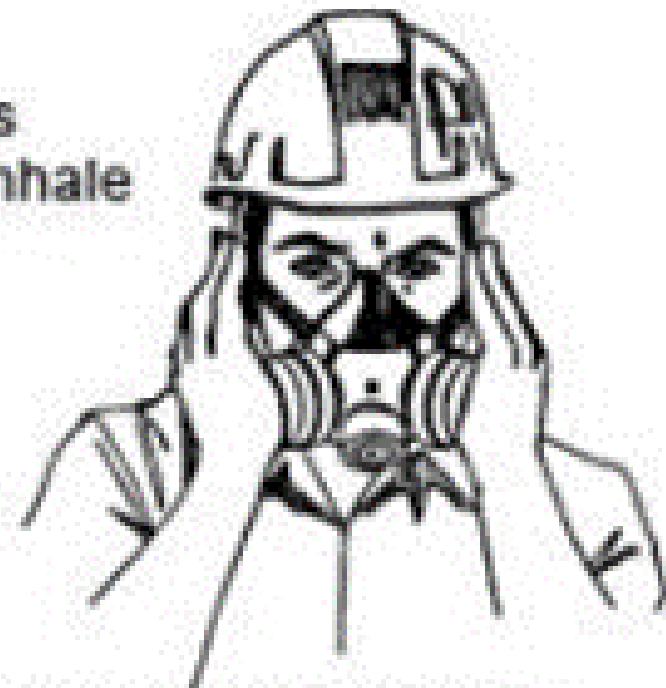
Repairs

- Respirators that fail an inspection or are otherwise found to be defective are removed from service and discarded or repaired/adjusted
 - Repairs made only by appropriately trained persons.
 - Use only respirator manufacturer's NIOSH-approved parts.

Use of Respirators

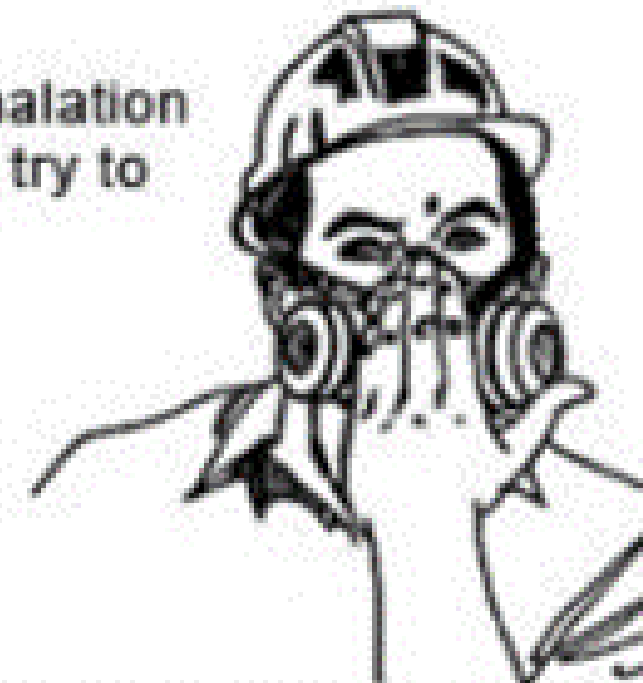
- Always put respirator on in clean air environment.
- Always seal-check the respirator to make sure proper fit has been achieved for tight-fitting respirators.
- Two types of user seal checks (Appendix B-1):
 - Negative Pressure
 - Positive Pressure

Cover inlets
and try to inhale



Negative pressure fit check

Cover exhalation
valve and try to
exhale



Positive pressure fit check

Use

- Respirators are only effective when the seal around your nose and mouth are tight.
 - If you cannot achieve proper fit, do not enter the contaminated area.
- Facial hair is not allowed when wearing a tight-fitting respirator.
- Glasses cannot be worn with a full-face respirator.
 - Spectacle kit required

Use

- Leave the contaminated atmosphere if any of the following occurs:
 - Smell or taste something out of the ordinary
 - Eyes or throat become irritated
 - Observe a change in breathing
 - Face piece is leaking or another part break
 - Alarms signaling equipment has failure or end of breathing air supply

Program Evaluation



- **Conduct workplace evaluations**
- **Consult employees concerning:**
 - **Respirator fit**
 - **Appropriate respirator selection**
 - **Proper respirator use**
 - **Proper respirator maintenance**

Recordkeeping

- Written program
- Medical evaluations
- Fit test records
- Emergency use respirator inspection

OSHA RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE 1910.134 Appendix C (mandatory)

To the Employer:

Answers to questions in Section 1, and to question 9 in section 2 of Part A, do not require a medical examination.

To the Employee:

Can you read? Yes No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory)

Date: ___/___/___

Employee Number: _____

Name: _____

Age: _____

Job Title: _____

Height: _____ ft. ___ in.

Weight: _____ lbs.

Phone number where you can be reached by the Health Care Professional who reviews this questionnaire (including Area Code): _____ Best time to reach you at this number: _____ days

Has your employer told you how to contact the health care professional who will review this questionnaire?

Yes No

Check the type of respirator you will use (you can check more than one category):

N, R, or P disposable respirator (filter-mask, non-cartridge type only) **N95**

Other type (for example, half – or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus)

Have you ever worn a respirator? Yes No If yes, what type(s): _____

Part A. Section 2. (Mandatory)

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month? Yes No

2. Have you ever had any of the following conditions?

a. Seizures (fits) Yes No

b. Diabetes (sugar disease) Yes No

c. Allergic reactions that interfere with your breathing Yes No

d. Claustrophobia (fear of closed-in places) Yes No

e. Trouble smelling odors Yes No

3. Have you ever had any of the following pulmonary or lung problems?

a. Asbestosis Yes No

b. Asthma Yes No

c. Chronic Bronchitis Yes No

d. Emphysema Yes No

e. Pneumonia Yes No

f. Tuberculosis Yes No

g. Silicosis Yes No

h. Pneumothorax / Collapsed lung Yes No

i. Lung cancer Yes No

j. Broken ribs Yes No

k. Any chest injuries or surgeries Yes No

l. Any other lung problems that you've been told about Yes No



Written Program

- Written program must contain procedures for:
 - Selecting respirators
 - Medical evaluations
 - Fit testing
 - Respirator use
 - Respirator maintenance
 - Ensuring adequate breathing air for SARs
 - Employee training
 - Program evaluation
 - Program must be worksite-specific

Voluntary Use

- For all respirators, the employer must:
 - Determine that voluntary use is appropriate.
 - Ensure that use of the selected respirator will not create a hazard.
 - Provide employees with information in Appendix D
- For all respirators except filtering face pieces, the employer must establish and implement a written program to address:
 - Medical evaluations, and
 - Training on maintenance, storage, and care.

All Mandatory OSHA Appendices

- Appendix A to § 1910.134: Fit Testing Procedures
- Appendix B-1 to § 1910.134: User Seal Check Procedures
- Appendix B-2 to § 1910.134: Respirator Cleaning Procedures
- Appendix C to § 1910.134: OSHA Respirator Medical Evaluation Questionnaire
- Appendix D to § 1910.134: Information for Employees Using Respirators When Not Required Under the Standard



KEY POINTS TO REMEMBER

- Selection and types of respirators
- Use, maintenance, and care of respirators

TAKE THE QUIZ

- <https://forms.office.com/Pages/ResponsePage.aspx?id=RZJ-M6ZIREqmNwvW9nbIKxyzzaSUgJJFgf5zZdrqY-IUMUdTRDdCV1JNMzVDVTVUVk1ZNFNGMjg0RC4u>