SECTION 3 CHAPTER 4
RESPIRATORY PROTECTION

Purpose

This section establishes the policy for respirator selection, use, and care.

Scope

This program applies to all company locations and personnel who are trained and fitted on the use of respirators and their supervisors.

In this chapter

General Policy

Purpose

This document outlines the basic respiratory protection policy, including:

- its scope
- the responsibilities of area management, supervisors and employees under the program
- the required forms

Policy

The respiratory policy is designed to prevent occupational injuries and illnesses to company employees from exposure to harmful atmospheric conditions, including:

- dusts
- fumes
- sprays
- fogs
- smokes
- vapors
- gases

Respiratory protection primarily consists of engineering controls that prevent atmospheric contamination, including:

- enclosure or confinement of the operation
- general and local ventilation
- substitution of less toxic materials

IF effective engineering controls are:

- not feasible
- being instituted or evaluated
- unable to reduce atmospheric contamination to acceptable levels,

THEN employees will use the appropriate respirator

The employer shall provide NIOSH approved respirators, training, and medical evaluations at no cost to the employee.

(Refer to *Health, Safety and Environmental Protection,* for inspection, maintenance, installation and removal of the above accepted brands of respiratory equipment)

This policy complies with OSHA 1910.134 regulations.

Yard Management and Supervisor responsibilities

Yard Management and Supervisors will:

- provide suitable respirators to protect the health of their employees
- ensure that personnel using respirators have a Medical Evaluation by a LHCP and have been fit-tested and properly trained on respirator:
  - selection (see "Selecting a Respirator")
  - care (see "Maintaining the Respirator")
  - use (see "Using a Respirator")
  - maintenance (see "Maintaining the Respirator")
- ensure that respirators are:
  - cleaned (see "Maintaining the Respirator")
  - repaired (see "Maintaining the Respirator")
  - inspected (see "Inspecting the Respirator")
  - stored properly (see "Maintaining the Respirator")
- inspect the respirators monthly (see "Inspecting the Respirator")
- ensure employees are using the equipment with the task
- monitor the work area for possible additional respiratory hazards
- notify area management, supervisors, or safety personnel immediately of malfunctions and concerns

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Employee responsibilities

Employees will:

- use respirators in accordance with the instructions and training they have received
- guard against damage to their respirators by:
  - inspecting their respirators prior to use (see "Inspecting the Respirator")
  - cleaning them after use (see "Maintaining the Respirator")
  - storing them after use (see "Maintaining the Respirator")
- report any trouble or malfunction of their respirators to their supervisors
- report any areas in the workplace that they feel has additional respirator hazards not addressed by the program

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Establishing a Respiratory Protection Program

Purpose

This document outlines the program:

- responsibilities
- administration
- elements

Program responsibilities

The company is responsible for implementing an effective respiratory protection program.

The Yard Manager, Supervisors, and HSE Coordinators are responsible for the administration of the respiratory protection program.

Program administration

The HSE Coordinator for each yard will be the Program Administrator and will:

- designate qualified, local medical professionals to perform the required OSHA medical evaluation for respirator users
- ensure each area schedules fit testing and pulmonary function tests when required
- ensure each area performs the required respiratory training before use and annually
- list any special requirements for rescue operations
- ensure medical history and medical evaluation questionnaires on respirator users are documented and kept by the medical provider
- ensure each area identifies work, tasks or processes that require the use of respirators
- ensure each area selects respirator, maintains equipment and proper storage
- ensure records are maintained for the program
- assist the Yard Manager in evaluating the program
- Inform and instruct the affected personnel when the program is updated.

Program elements

Respiratory programs will establish written standard operating procedures for:

- program implementation and administration, including:
  - respirator selection and approval
  - respirator distribution
  - respiratory training program
  - medical evaluation
  - respiratory program evaluations
- respirator use, including:
  - respirator fit and inspections
  - physiological and psychological limitations for respirator users
  - respiratory hazard monitoring
  - reviews when job or materials change for the task
  - monitoring chemical inventory at each location
  - respirator maintenance

Evaluating the Effectiveness of the Respiratory Program

Purpose

This document describes the procedures for:

- conducting annual program evaluations
- evaluating user acceptance
- evaluating the protection offered by the program
- inspecting the program
- handling excessive exposure

Conducting annual evaluations

Conduct annual evaluations of the respirator program to:

- ensure adequate respiratory protection
- recommend improvements
- correct any deficiencies

Evaluate the program based on:

- user acceptance
- medical appraisal
- program inspection

Evaluating user acceptance

At least once a year, ask the respirator users about:

- their comfort and/or fatigue while wearing the respirator
- the respirator's interference with
  - breathing
  - vision, particularly:
    - visibility under all conditions
    - provisions for wearing prescription glasses
  - communications
  - movement
  - job performance
- their confidence in the effectiveness of the respirator and face piece fit

Evaluating the protection offered by the program

Conduct medical evaluations of respirator users annually.

Document findings on the "Medical History Questionnaire for Respirator Users."

When considered with the results of monitoring respiratory hazards, this data can indicate the degree of protection provided by the respirators and the overall effectiveness of the respirator program.

Inspecting the program

Field Safety representatives will conduct frequent random inspections to ensure that the:

- respirator users are trained properly
- respirators are properly
  - selected
  - used
  - cleaned
  - inspected
  - maintained
  - stored
- hazards are monitored
- medical evaluations for users are provided as necessary
- user problems are reported immediately

Handling excessive exposure

IF evidence of excessive exposure to respiratory hazards is found due to defective respiratory equipment, **THEN** any deficiency found will be corrected immediately.

Training Requirements

Purpose

This document describes the requirements for training:

- supervisors
- respirator distributors
- employees

Yard management, supervisors and HSE coordinators are responsible for ensuring all applicable employees are trained by certified company trainers or certified third parties and training records kept on file.

Company training

Company certified trainers will be trained on the:

- nature and extent of respiratory hazards
- basic respirator-protection practices
- training requirements for respirator users
- distribution of respirators
- fit testing
- regulations (OSHA 1910.134) concerning respirator use

Respirator distributor training

The person assigned to issue respirators will be trained to ensure that employees select the correct respirator for each situation and use.

Employee training requirements

Retrain respirator users annually on:

- respiratory hazards and the consequences of not using a respirator
- respiratory equipment selection and use of respirators
- basic respirator protection practices
- respiratory protection program and policy
- how to maintain respirators and properly store them
- signs and symptoms (medical) of limitations for respiratory users
- emergency use

Developing Training Courses

Purpose

This document lists the content for courses on respiratory:

- hazards
- equipment
- protection practices
- policy

Discussing respiratory hazards

Courses on respiratory hazards and airborne contaminants will cover their:

- physical properties
- toxicity
- physical effects
- detection methods

Discussing respiratory equipment

When training employees on respiratory equipment, provide an overview of available respiratory equipment, including:

- description of the respirator to be used
- instruction on:
  - construction
  - operation
  - capabilities
  - limitations
  - selection criteria
  - types of filters/canisters

Since many respirators, particularly air-purifying respirators, are designed and selected on the basis of chemical and physical properties of the air contaminants, it is important to discuss the classification, description, and limitations of respirators, including:

- atmosphere-supplying respirators
  - self-contained
  - supplied-air
  - combination self-contained and supplied-air
- air-purifying respirator
  - gas and vapor
  - particulate contaminants
  - combination gas, vapor and particulate contaminants
- combination atmosphere-supplying and air-purifying respirators

Discussing basic respirator-protection practices

Discuss respirator:

- selection
- inspection
- maintenance
  - care
  - cleaning
- storage
- use
  - the function, capabilities, and limitations of the selected respirator
  - donning, wearing, and doffing the respirator
  - regulations concerning respirator use
  - fit-testing and checking for adequacy of fit, including adjusting the respirator for maximum comfort
  - instructions for emergency use

During the session, allow time for personnel to wear the respirator in both safe and test environments so that they may practice:

- handling the respirator
- wearing it properly
- checking its seals

Discussing the respiratory protection policy

Discuss:

- the engineering and administrative controls being used
- the effort to eliminate the need for respirators through these engineering controls
- the capabilities and limits of engineering controls
- the need for respirators to provide additional protection
- the consequences of not using a respirator or of using a respirator improperly

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Analyzing Atmospheric Conditions

Purpose

This document discusses the elements of hazardous atmospheric conditions, including:

- atmospheres not immediately dangerous to life or health
- atmospheres immediately dangerous to life or health
- respiratory hazards
- oxygen deficiency
- gas and vapor contaminants
- particulate contaminants
- combinations of gas, vapor, and particulate contaminants

It also lists the requirements for monitoring hazardous conditions.

Definition: atmospheres not immediately dangerous to life or health

Atmospheres not immediately dangerous to life or health are atmospheres that may cause immediate discomfort or produce harm after prolonged exposure but do not cause permanent damage during a single, short term exposure.

Definition: atmospheres immediately dangerous to life or health (IDLH)

An atmosphere immediately dangerous to life or health (IDLH) is one from which an unprotected worker cannot escape without suffering permanent eye and/or respiratory damage or possible death.

Respiratory hazards

Respiratory hazards include:

- oxygen deficiency
- gas and vapor contaminants
- particulate contaminants and aerosols, including:
  - dust
  - fog
  - fume
  - mist
  - smoke
  - spray
- combination of gas, vapor, and particulate contaminants

These conditions are described below.

Oxygen deficiency

Do **not** enter atmospheres that:

- are oxygen deficient, less than 19.5 % oxygen by volume
- or contains more than 23.5% oxygen by volume

An atmosphere at sea level is considered to be oxygen deficient if it contains less than 19.5% oxygen by volume. Normal air at sea level contains 20.9% oxygen by volume.

Severe oxygen deficiency can result in death in minutes. The following chart outlines the physiological effects of oxygen deficiency.

% Oxygen*	Physiological Effects
12-16%	• loss of peripheral vision • Increased breathing volume • Accelerated heartbeat • Impaired attention and thinking • Impaired coordination
10-12%	• Very faulty judgment • Very poor muscular coordination • Muscular exertion causes fatigue that may cause permanent heart damage • Intermittent respiration
6-10%	• Nausea and vomiting • Inability to perform vigorous movement • Unconsciousness • Death
Less than 6%	• Spasmodic breathing • Convulsive movements • Death in minutes

Gas and vapor contaminants

Gas and vapor contaminants include:

- simple and chemical asphyxiates
- irritants
- anesthetics
- sensitizers
- systemic poisons
- carcinogens

Continued on next page

Gas and vapor contaminants *continued*

The following chart describes the effect of gas and vapor contaminates.

Contaminant	Effect	Examples
Simple and chemical asphyxiates	Asphyxiates create an oxygen deficient atmosphere by diluting oxygen in the air **or** interfering with the supply or use of oxygen in the body.	**Simple asphyxiates** • nitrogen • hydrogen • helium • methane **Chemical asphyxiates** • carbon monoxide • hydrogen cyanide • cynanogen • nitrides
Irritants	Cause irritation and inflammation of parts of the respiratory system, skin, and eyes, as well as pulmonary edema.	• ammonia hydrogen chloride • formaldehyde • sulfur dioxide • chlorine • ozone • nitrogen dioxide • phosgene • arsenic trichloride
Anesthetics	Cause loss of feeling. May cause unconsciousness, death, or injury to internal organs.	**Lethal** • nitrous oxide • hydrocarbons • ethers **Harmful** • carbon tetrachloride (liver and kidneys) • chloroform (liver and heart) • benzene (bone marrow) • carbon disulfide (nervous system)
Sensitizers	Amplify the effects of other chemicals	• isocyanates • epoxy resin systems
Systemic poisons	Damage organs and systems in the body	• mercury (nervous system, various organs) • phosphorus (bone) • hydrogen sulfide (respiratory paralysis) • arsine (red blood cells and liver)
Carcinogens	May eventually produce cancer	• vinyl chloride • benzene

Particulate contaminants

Particulate contaminants include:

- dust
- fog
- fume
- mist
- smoke
- spray

The chart below describes their effects on the body.

Classification	Effect	Example
Allergy-producing	Cause itching, sneezing and asthma	• pollens • spices • animal fur
Febrile-reaction-producing	Produce chills followed by fever	• zinc fumes • copper fumes
Carcinogens	May eventually lead to cancer	• asbestos • chromates • radioactive particulates
Chemical irritants	Produce irritation, inflammation and ulceration in upper respiratory tract	• acidic mists • alkalis
Pulmonary-fibrosis-producing	Produce nodulation and fibrosis in the lung, possibly leading to complications	• quartz • asbestos
Relatively inert	May cause discomfort and minor irritation, but generally do not cause injury at reasonable concentrations	• marble • gypsum
Systemic poisons	Produce pathologic reactions in various systems of the body	• lead • manganese • cadmium

Combinations of gas, vapor, and particulate contaminants

Combinations of contaminates may occur in the atmosphere. These combinations may contain entirely different substances (e.g., dusts and gases from blasting) or the particulate and vapor forms of the same substance.

Combinations of contaminants can have a greater physiological impact than one contaminant would have created on its own. Some combinations may require extraordinary protective measures.

Determining Appropriate Protective Measures

Purpose

This document lists the requirements for:

- documenting the selection of protective measures
- performing medical evaluations of personnel using respirators
- determining physiological and psychological limitations

Policy

Only personnel who are physically able to perform the work and have passed the medical exam will be permitted to use the equipment for assigned tasks requiring the use of respirators.

Performing medical evaluations of personnel using respirators

A medical professional or PLHCP (Physician or Licensed Health Care Professional) will certify whether an employee is permitted to use a respirator based on:

- the job/tasks to be performed
- a medical evaluation
- the medical history questionnaire
- the results of the pulmonary test, if required by PLHCP
- the questionnaire will be kept by the PLHCP

Medical evaluation prior to fit-testing is confidential, performed during normal working hours, convenient, understandable, and the employee is given a chance to discuss the results with the physician or other licensed health care professional (PLHCP).

In the event an employee is determined to have conditions where a pulmonary fit test is requested by a PLHCP, these employees will not be allowed to use respirators without a successful, annual pulmonary test. Based on the medical exam, the employee will be classified as one of the following:

Classification	Description
Class 1	No restrictions on respirator use.
Class 2	Some specific use restrictions.
Class 3	Cannot use respirators under any circumstances.

A PLHCP will review the respirator user's medical status annually to determine whether he/she is receiving adequate respiratory protection.

Physiological and psychological limitations

A physician will determine what physiological and psychological conditions are pertinent for the wearing of different types of respirators.

The Director of Safety will use the physician's guidelines to determine whether a person may be assigned to a task requiring the use of a respirator. This determination will be reviewed at least annually.

Confidentiality

Questionnaires and medical exams will remain confidential between the employee and physician.

Selecting a Respirator

Purpose

This document provides an overview of the selection:

- policy
- criteria
- procedure

Policy

Company employees will only use NIOSH approved respirators issued by authorized company personnel. Employees may not furnish their own.

The Respirator Program Administrator (Director of Safety) will select respirators for use by company employees from the list of respirators approved by the National Institute of Occupational Safety and Health (NIOSH).

Respirators will be approved for use with specific hazards based on the manufacturer's instructions. Respirators shall not be modified.

Criteria

Respirators will be selected based on the:

- operation or process characteristics
  - normal procedures
  - situation-specific modifications, if any
  - worker's activities and work rate
- materials to be handled during the process
  - raw materials
  - end-products
  - by-products (actual and potential)
- worker's location with respect to a safe area containing respirable air and the feasibility of:
  - escape planning in case of emergencies
  - maintenance work
  - rescue operations
- length of respirator use
  - total time period of potential exposure
  - rate of use during that time period (intermittent vs. continuous respirator use)
- nature of the hazard
- physical characteristics and functional capabilities and limitations of the various types of respirators
- respirator protection factors

Assigning a respirator protection factor

IF…	THEN…
a group of persons wear respirators in a given work area,	assign a single respirator protection factor to the entire group
negative-pressure respirators are being used,	• perform respirator fit on every person who will work in the suspect area (see "Performing a Respirator Fit-Test") • assign a protection factor that corresponds to the lowest value determined by the fit tests

Procedure

Use this procedure to select a respirator, except in emergency or rescue operations.

Step	Action
1	Determine whether the respiratory hazard is a result of oxygen deficiency or a specific contaminant.

2	**IF** the hazard is a contaminant, **THEN:**
	• identify the nature of the contaminant
	  ❍ particulate matter, vapors, or gas
	  ❍ chemical and physical properties
	  ❍ warning properties
	• and its concentration
	  ❍ average, actual, and peak concentrations vs. established permissible time-weighted average or peak concentrations
	  ❍ physiological effects of those concentrations over time

3	Determine the class of respiratory protection required.

IF the atmosphere …	THEN select a respirator from the table in…
is immediately dangerous to life or health (IDLH),	"Selecting a Respirator for Atmospheres Immediately Dangerous to Life or Health"
is oxygen-deficient,	"Selecting a Respirator for Oxygen-Deficient Atmospheres"
contains adequate oxygen and is not	"Selecting a Respirator for Atmospheres with Adequate

	IDLH,	Oxygen And Are Not IDLH”

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Step	Action
4	Select a respirator from the appropriate class based on employee acceptance factors, including: • comfort • breathing resistance • respirator weight • interference with vision or work **IF** an individual can obtain an acceptable fit with two or more respirators within the selected class, **THEN** allow the individual to use the respirator model that he or she prefers.

Selecting a Respirator for Atmospheres Immediately Dangerous to Life or Health

Purpose

This document lists respirators available for use in atmospheres that may contain adequate oxygen but are immediately dangerous to life or health (IDLH) due to toxic contamination.

Workers may **not** use **negative pressure** respirators in these environments.

Positive pressure respirators

The positive pressure respirators available for use in these atmospheres are listed below.

Respirator Type	Face Piece	Required Escape Provisions	Respirator Protection Factor
Air-line, continuous flow or pressure demand type	Any face piece[4]	Yes, worker carries an auxiliary self-contained supply of respirable air	The maximum protection factor is 10,000 plus
Air-line, continuous-flow	• Helmet • Hood **or** • Suit	Yes, worker carries an auxiliary self-contained supply of respirable air	The maximum protection factor is 10,000 plus
Powered particulate filter	Any respiratory inlet covering	Yes[1]	The maximum protection factor is 100 with a dust, fume or mist filter, and 3000 with a high-efficiency filter[2]
Powered vapor-or gas removing	Any respiratory inlet covering	Yes[1]	The lesser of: • 3000 • maximum use limit of cartridge or canister for vapor or gas[3]
Powered combination particulate-filter and vapor-or-gas-removing	Any respiratory inlet covering	Yes[1]	The lesser of: • 100 with a dust, fume or mist filter • 3000 with a high-efficiency filter[2] • maximum use limit of cartridge or canister for vapor or gas[3]
Self-contained breathing apparatus, pressure demand-type open circuit or positive-pressure type	• quarter mask • half mask • full facepiece **or** • mouthpiece/ nose clamp	Yes[1]	The maximum protection factor is 10,000 plus

closed circuit,			

Notes

[1]Escape provisions are outlined below.

IF the respirator is equipped …	THEN the worker must…
with a face piece,	be able to breathe through the filter, cartridge, or canister and the pump
With a helmet, hood, or suit,	carry an auxiliary self-contained supply of respirable air

[2]Use a high-efficiency filter to protect against airborne:

- contaminants with a permissible time-weighted average concentration less than 0.05 milligrams per cubic meter of air or 2 million particles per cubic foot of air
- radionuclide contaminants

[3]Vapor and gas removing respirators are not approved for contaminants that lack adequate warning properties of odor, irritation, or taste at concentrations at or above the permissible exposure limits.

Cartridges and canisters may provide only short service lives for certain vapors and gases. The service life of these cartridges or canisters depends on the:

- specific vapor or gas
- concentration in the air
- temperature and humidity of the air
- type and quantity of the sorbent in the cartridge or canister
- activity of the respirator wearer

Test vapor/gas service life and refer to published vapor/gas life data to verify that cartridges and canisters provide adequate service lives.

[4]If the contaminant irritates the eyes; worker may use protective goggles or a full-face piece.

Combination respirators

In general, the type and mode of operation with the lowest respirator protection factor establishes the protection factor for the entire respirator.

Selecting a Respirator for Oxygen-Deficient Atmospheres

Purpose

This document lists the respirators that are suitable for use in oxygen-deficient atmospheres.

Policy

Only use respirators that provide an independent, respirable atmosphere.

Most respirators approved for use in atmospheres that are immediately dangerous to life or health (IDLH) may also be used in oxygen-deficient atmospheres. The only exceptions are the powered:

- particulate-filter respirators
- vapor or gas removing respirators
- combination particulate filter and vapor or gas removing respirators

These respirators do **not** provide sufficient protection in an oxygen-deficient atmosphere.

Negative pressure respirators

In addition to most respirators approved for use in IDLH atmospheres, personnel may choose to use any of the models listed below.

Respirator Type	Face Piece	Escape Provisions	Protection Factors	
			Quantitative	Qualitative
Air-line demand	Quarter mask[1]	Optional, worker may carry an auxiliary self-contained supply of respirable air	10	As measured on each person, but limited to concentrations below the IDLH[2] values
Air-line demand	Full face piece	Optional, worker may carry an auxiliary self-contained supply of respirable air	100	As measured on each person, but limited to concentrations below the IDLH values
Hose mask, with or without blower	Full face piece	N/A	10	As measured on each person, but limited to concentrations below the IDLH values
Self-contained breathing apparatus demand open circuit **or** negative pressure closed circuit	Quarter mask **or** Half mask[1]	N/A	10, with a full face piece or a mouthpiece/ noseclamp, the protection factor is 100, except when the respirator is used for mine rescue and recovery operations.	As measured on each person, but limited to concentrations below the IDLH values

Notes

[1]If the air contaminant irritates the eyes worker may use protective goggles or a full face piece.

[2]IDLH: Immediately dangerous to life or health.

Positive pressure respirators

The positive pressure respirators available for use in oxygen-deficient atmospheres are listed below.

Respirator	Face Piece	Escape Provisions	Respirator Protection Factor
Air-line continuous flow or pressure demand type	Any face piece[1]	Optional, worker may carry an auxiliary self-contained supply of respirable air	Limited to concentrations below the IDLH values With escape provisions, the maximum protection factor is 10,000 plus
Air-line continuous flow	• helmet • hood • suit	Optional, worker may carry an auxiliary self-contained supply of respirable air	Limited to concentrations below the IDLH values With escape provisions, the protection factor is 10,000 plus

Notes

[1]If the contaminant irritates the eyes; the worker may use protective goggles or a full-face piece.

Combination respirators

In general, the type and mode of operation with the lowest respirator protection factor establishes the protection factor for the entire respirator.

Selecting a Respirator for Atmospheres with Adequate Oxygen And Are Not IDLH

Purpose

This document lists the respirators suitable for use in environments with adequate oxygen that are not immediately dangerous to life or health.

Policy

All respirators approved for use in oxygen-deficient atmospheres or atmospheres that are immediately dangerous to life or health may be used in atmospheres that contain adequate oxygen and are not immediately dangerous to life or health.

In addition, workers may use any of the negative pressure respirators listed below.

Negative pressure respirators

Respirator Type	Face Piece	Respirator Protection Factors	
		Quantitative	Qualitative
Particulate filter[1]	Quarter mask Half mask[3]	10	As measured on each person with a maximum of 100
Particulate filter[1]	Full face	100	As measured on each person with maximum of 100 if dust fume, or mist filter is used, or maximum of 1000 if high-efficiency filter is used.
Vapor or gas removing	Quarter mask Half mask[3]	The lesser of: • 10 • maximum use limit of cartridge or canister for vapor or gas	The lesser of: • individual measurement with maximum of 100 • maximum use limit of cartridge or canister for vapor or gas[2]
Combination particulate-filter and vapor- or gas-removing[1]	Quarter mask Half mask[3]	The lesser of: • 10 • maximum use limit of cartridge or canister for vapor or gas	The lesser of: • individual measurement with maximum of 100 • maximum use limit of cartridge or canister for vapor or gas[2]
Vapor or gas-removing	Full	The lesser of: • 100 • maximum use limit of cartridge or canister for vapor or gas	The lesser of: • individual measurement with a maximum of 1000 • maximum use limit of cartridge or canister for vapor or gas[2]

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Respirator Type	Face Piece	Respirator Protection Factors	
		Quantitative	Qualitative
Combination particulate-filter and vapor-or gas-removing[1]	Full	The lesser of: • 100 • maximum use limit of cartridge or canister for vapor or gas	The lesser of: • individual measurement with maximum of 100 if dust, fume, or mist filter is used and maximum of 1000 if high-efficiency filter is used • maximum use limit of cartridge or canister for vapor or gas[2]

Notes

[1]Use a high-efficiency filter to protect against airborne:

- contaminants with a permissible time-weighted average concentration less than 0.05 milligrams per cubic meter of air or 2 million particles per cubic foot of air
- radionuclide contaminants

[2]Vapor and gas removing respirators are not approved for contaminants that lack adequate warning properties of odor, irritation, or taste at concentrations at or above the permissible exposure limits.

Cartridges and canisters may provide only short service lives for certain vapors and gases. The service life of these cartridges or canisters depends on the:

- specific vapor or gas
- concentration in the air
- temperature and humidity of the air
- type and quantity of the sorbent in the cartridge or canister
- activity of the respirator wearer

Test vapor/gas service life and refer to published vapor/gas life data to verify that cartridges and canisters provide adequate service lives.

[3]If the contaminant irritates the eyes; the worker may use protective goggles or a full-face piece.

Combination respirators

In general, the type and mode of operation with the lowest respirator protection factor establishes the protection factor for the entire respirator.

Respirator Fit-Test Requirements

Purpose

This document describes the requirements for respirator fit-tests, including:

- qualitative respirator fit testing
- quantitative respirator fit testing
- documenting the respirator fit test record

Policy

Perform respirator-fit tests to select a specific type, make and model of negative or positive-pressure respirator for use by that individual.

Repeat the respirator-fit test:

- as needed
- at least annually
- before entering a harmful atmosphere

Selection of a respirator

Use the following procedure to test the fit of selected respirators.

Step	Action
1	Put on the face-piece.
2	Adjust the headbands so that the unit is snug with no distortion.
3	Have the user simulate common work movements.
4	Check the face-fit.

IF…	THEN…
the user is comfortable with the face-piece and weight of the device **AND** the device doesn't interfere with vision or breathing,	the fit is satisfactory
The user isn't comfortable with the face-piece and weight of the device **OR** the device interferes with vision or breathing,	try another model and/or brand

Continued on next page

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>5</td><td>Use either a negative or positive pressure test to check the seal.
<table>
<tr><th>IF performing a…</th><th>THEN…</th></tr>
<tr><td>negative pressure test,</td><td>1. Close the inlet valve on the cartridge (some masks may require you to remove the filter holder).
2. Inhale gently until the face-piece collapses slightly.
3. Hold your breath for 10 seconds.
IF the face-piece remains collapsed and there are no signs of inward leakage, THEN there is a proper seal.</td></tr>
<tr><td>Positive pressure test,</td><td>Block the exhalation valve and breathe into the mask.
IF pressure can be built up inside the mask without air leaking out between the mask and the face of the user, THEN there is a proper seal.</td></tr>
</table></td></tr>
<tr><td>6</td><td>Verify the respirator’s effectiveness through either a qualitative test or a quantitative test as described below.</td></tr>
<tr><td>7</td><td>Document the results of the test.</td></tr>
<tr><td>8</td><td>Test each available respirator make and model until you find a satisfactory respirator for that individual.</td></tr>
</table>

Fit Testing (Qualitative or Quantitative)

Must be performed by a certified third party or certified company representative. All employees subject to wearing a respirator must be fit tested prior to initial use, whenever a different respirator face piece is used, and at least annually thereafter. An additional fit test is required whenever the employee, physician, supervisor or the program administrator makes visual observations of changes in the employee’s physical condition that could affect the respirators fit.

Using a Respirator

Purpose

This document outlines the:

- policy for using respirators
- procedure for ensuring a satisfactory respirator seal
- procedure for monitoring respirator use
- procedure for leaving the hazardous areas

Policy

Employees are required to use respirators when:

- spray painting (see the chapter on *Performing Spray Painting Operations* in this manual)
- working in dusty conditions
- working near hydrogen sulfide (see the chapter on *Protecting against Hydrogen Sulfide* in this manual)
- handling chemicals that emit toxic fumes (see the chapter on *Handling Hazardous Materials* in this manual)
- working in confined spaces (see the chapter on *Entering Confined Spaces* in this manual)
- working near spills, leaks, and other emergencies (see "Using Respirators for Emergencies and Rescues" in this chapter)

IF surveillance and monitoring of work and environmental conditions change, **THEN** determine whether the conditions require the use of respirators.

Ensuring a satisfactory respirator seal under special conditions

When using respirators with a full face-piece, hard hat, hood or suit, personnel will not be allowed to wear any head covering which passes between the sealing surface of the face piece and the user's face.

Accommodating facial hair

Facial hair that passes between the face and the sealing surface of the face-piece of the respirator may prevent a perfect seal between the respirator face piece and the user or interfere with the valves. Before using a respirator, make sure that the seal and valve function is not impacted by:

- stubble
- moustache
- sideburns
- beard
- low hairline
- bangs

IF employees have facial hair that interferes with the face seal, **THEN** either the facial hair has to be removed **OR** the employee can not perform the work required.

Accommodating facial structure

The wide range of face dimensions requires more than a single size of respirator face pieces to provide a proper fit to all respirator users. Test a variety of brands and models to find one that provides the proper seal.

IF…	THEN…
missing teeth or dentures prevent a seal of a respirator mouthpiece on a person's mouth,	do **not** allow the person to wear a respirator equipped with a mouthpiece
A person has a nose of a shape or size that prevents the closing of the nose by the nose clamp,	do **not** permit the person to wear a respirator equipped with a mouthpiece/noseclamp
A satisfactory respirator seal is prevented by: • scars • hollow temples • excessively protruding cheekbones • deep creases in facial skin • missing teeth or dentures • unusual facial configurations	do **not** permit the individual to wear the respirator

Accommodating corrective lenses

When using respirators with a full face-piece, hard hat, hood or suit, personnel will **not** be allowed to wear:

- eye and face protective devices
  - spectacles with temple bars or straps which pass between the sealing surface of the face piece and the wearer's face
  - goggles
  - face shield
  - welding helmets
  - other eye and face protective devices
- contact lenses

IF a respirator user must wear…	THEN…
• a protective spectacle or goggle • a face shield • other eye and face protective device,	fit the item to provide good vision without interfering with the seal of the respirator
Corrective lenses,	• use a corrective spectacle with short temple bars that do not protrude between the sealing surface **OR** • use special corrective lenses made to be mounted inside a full-face piece

Monitoring respirator use

Supervisors will monitor respirator use to ensure that the:

- correct respirators are being used
- respirators are being worn properly
- respirators being used are in good working condition

IF a respirator has been marked for identification purposes, **THEN** verify that the markings do **not** affect the respirator performance in any way.

Leaving the hazardous area

A respirator user will be permitted to leave the hazardous area for any respirator-related cause. Reasons which may cause a respirator user to leave a hazardous area include, but are not limited to:

- failure of the respirator to provide adequate protection
- malfunction of the respirator
- detection of air contaminant in the respirator
- increase in resistance to breathing
- severe discomfort
- illness:
  - dizziness
  - nausea
  - weakness
  - coughing
  - sneezing
  - vomiting
  - fever
  - chills

Using Respirators in IDLH Atmospheres

Purpose

This document outlines the procedure for:

- entering atmospheres immediately dangerous to life or health (IDLH)
- using respirators in confined spaces

Entering atmospheres IDLH

Use the following procedure to enter an atmosphere that is immediately dangerous to life or health.

Step	Action
1	Obtain the proper protective equipment.
2	Station at least one standby person in a safe area.
3	Make provisions to relocate the respirator users to a safe environment if necessary, by: • providing the standby person with the proper equipment to assist the respirator user(s) in case of emergency
4	Instruct remaining personnel not to enter the atmosphere.
5	While personnel are in the suspect area, maintain communications between the standby person and the respirator user(s) using: • visual • voice • signal-line • telephone • radio • other suitable means

Using respirators in confined spaces

Before entering a confined space, test the atmosphere to determine the concentration of toxic contaminant and concentration of oxygen present. Do **not** enter an IDLH atmosphere without a respirator.

IF…	THEN…
the concentration of air contaminants in a confined space is below the established limits and sufficient oxygen is present,	continuously ventilate the enclosed space and monitor the concentration of air contaminants and oxygen while personnel are in the area
the atmosphere is not legally oxygen deficient and the concentrations of air contaminants are not immediately dangerous to life or health,	personnel may wear air-purifying respirators listed in “Selecting Respirators for Use in Atmospheres with Adequate Oxygen and Are Not IDLH”

Continued on next page

IF…	THEN…
the atmosphere is immediately dangerous to life or health due to: • oxygen deficiency • high concentrations of air contaminants • concentrations of a substance (gas or vapor) above the lower flammable limits,	personnel wear either a positive-pressure self-contained breathing apparatus or a combination positive pressure-air-line respirator with an auxiliary self-contained air supply listed in "Selecting Respirators for Use in Atmospheres that Are Immediately Dangerous to Life or Health" Note: Do **not** wear an oxygen type open circuit self-contained breathing apparatus in a confined space where there is a possibility of fire or explosion.

Using Air-Purifying Respirators

Purpose

This document provides an overview of the operation, use, equipment, benefits, and limitations of air-purifying respirators.

It also provides specific information for using:
- vapor and gas removing respirators
- particulate removing respirators
- combination particulate and vapor and gas removing respirators

Operation

Air-purifying respirators pass ambient air through a filter, cartridge, or canister that removes particles, vapors, gases, or a combination of these contaminants before the user inhales it.

The user operates the non-powered type of respirator by simply breathing. Non-powered air-purifying respirators are equipped with a face piece or mouthpiece and nose clamp.

Use

These respirators are **not** approved for use in atmospheres immediately dangerous to life or health.

Equipment

This class of respirators may be equipped with a:
- full face piece
- quarter mask face piece
- half mask face piece

The fabric covering (facelet) available from some manufacturers is not approved for use by company employees.

Similarly, the mouthpiece respirator may only be used for escape operations, as mouth breathing prevents the detection of contaminants by odor. Nose clamp must be securely in place to prevent nasal breathing.

Benefits

These devices are small, light, and simple to operate, and may be donned quickly.

General limitations

Air-purifying respirators do not protect against:

- oxygen-deficient atmospheres
- skin irritations
- absorption through the skin of airborne contaminants

Ability to protect

An air-purifying respirator's protection is limited by face piece to face seal on the user and the design efficiency and capacity of the:

- cartridge
- canister
- filter

The manufacturer specifies the maximum concentration of gases and vapors that the air-purifying element protects against. These limits are listed on the cartridge or canister label.

Non-powered air-purifying respirators will not provide the maximum design protection unless the face piece or mouthpiece and nose clamp assembly is carefully fitted to prevent inward leakage.

Length of protection

The length of protection depends on the:

- canister, cartridge, or filter type
- contaminant concentration
- humidity
- user's respiratory rate

Users must select the proper canister, cartridge, or filter for the particular atmosphere and conditions.

Face pieces

Although full-face piece respirators protect against eye irritation, they present special problems to individuals required to wear prescription lenses.

Using vapor and gas removing respirators

Vapor and gas-removing respirators are equipped with cartridges or canisters to remove:

- a single vapor or gas (e.g., chlorine gas)
- a single class of vapors or gases (e.g., organic vapors)
- a combination of 2 or more classes of vapors or gases (e.g., organic vapors and acidic gases)

Limitations

Vapor and gas-removing respirators provide no protection against particulate contaminants.

A rise in canister or cartridge temperature indicates that a gas or vapor is being removed from the inspired air. An uncomfortably high temperature indicates a high concentration of gas or vapor and requires an immediate return to fresh air.

Do **not** use these respirators in atmospheres where the contaminant lacks sufficient warning properties such as odor, taste, or irritation, when it nears or exceeds the permissible exposure limit.

Using particulate removing respirators

Particulate removing respirators are equipped with filters to remove a single type of particulate (e.g. dust) or a combination of 2 or more types of particulates (dust and fume) from the air.

The filter may be a temporary or permanent part of the respirator. Filter may be single-use or reusable.

Limitations

This class of respirator only protects against nonvolatile particles and provides no protection against gas and vapor contaminants.

Using combination particulate and vapor and gas removing respirators

Combination particulate and gas or vapor removing respirators are equipped with filters and cartridges or canisters to remove:

- particulate matter
- vapors
- gases

The filter may be a permanent or temporary part of the respirator.

Limitations

All of the disadvantages and advantages for particulate and gas or vapor removing respirators apply to these combination respirators.

Using Atmosphere-Supplying Respirators

Purpose

This document discusses atmosphere-supplying respirators, including their:

- use
- types
- limitations

It also briefly reviews:

- the operation, benefits and limitations of:
  - self-contained breathing apparatus (SCBA)
  - open circuit SCBA
- the requirements for respirable air and oxygen supplies

Description

Atmosphere-supplying respirators supply a respirable atmosphere independent of the ambient air. The following chart describes the three types of atmosphere-supplying respirators.

Type	Air Supply
supplied air respirators	stationary source of compressed air
self-contained breathing apparatus (SCBA) • open-circuit SCBA	the user carries the air or oxygen with him/her
combination SCBA and supplied-air respirator	stationary source of compressed air **and** a separate air cylinder carried by the user

Use

These respirators provide the best protection against oxygen deficient or toxic atmospheres that are immediately dangerous to life or health.

These respirators are equipped with a low pressure alarm, which warns the user when approximately 5 minutes of air remain in the cylinder.

Never go further into a contaminated area than you can get out of in five minutes. **IF** the respirator alarm sounds, **THEN** leave the area immediately.

General limitations

With the exception of some air-line suits, this class of respirators will not protect against skin irritation by materials such as ammonia and hydrogen chloride or against absorption of materials including:

- hydrogen cyanide
- tritium
- organic phosphate pesticides

Face pieces also present special problems to individuals required to wear prescription lenses.

As a result, use of this class of respirators in atmospheres immediately dangerous to life or health is limited to specific devices and conditions.

Using self-contained breathing apparatus (SCBA)

SCBA users carry air, oxygen or oxygen-generating material. SCBA gear is normally equipped with a full face piece, however, it may also be used with:

- hard hat
- hood

Limitations

Chief limitations for this class are:

- weight
- bulk
- limited service life
- training required for their maintenance and safe use

Since the user carries his or her own breathing atmosphere, the period over which the device will provide protection is limited by the:

- amount of air or oxygen the user can carry
- ambient atmospheric pressure (service life of open circuit devices is cut in half by a doubling of the atmospheric pressure)
- type of work being performed

SCBA devices with a service life less than 15 minutes are suitable only for escape from irrespirable atmospheres.

Using open-circuit SCBA

Open circuit SCBA use:

- compressed air
- compressed oxygen
- liquid air
- liquid oxygen

Unless the open circuit SCBA is designed for use on escape operations only, it will include a bypass system in case of regulator failure.

Open-circuit SCBA is available in demand and positive pressure models.

Demand

The demand valve opens on inhalation to permit the oxygen or air to flow into the face piece. Exhalation creates positive pressure in the face piece, which in turn closes the demand valve. Exhaled breath passes to the ambient atmosphere through a valve in the face piece.

Positive Pressure

These respirators are equipped with only a face piece. Positive pressure is maintained in the face piece by a spring-loaded or balanced regulator and exhalation valve. Some models may allow the wearer to choose between the demand or positive pressure mode of operation.

IF the user is allowed to choose between the demand or positive pressure mode of operation, **THEN** users must only use the demand mode when donning or doffing the apparatus.

Limitations

Demand type respirators produce a negative pressure during inhalation, which may permit inward leakage of contaminants. Pressure-demand respirators maintain positive pressure during inhalation and are less likely to permit inward leakage of contaminants.

Using Supplied Air Respirators

Purpose

This document provides an overview of operation, use, and limitations of supplied air respirators, including:

- air-line respirators
- combination air-line respirators with auxiliary self-contained air supply

Using an air-line respirator

Air-line respirators draw respirable air through a small-diameter hose from a compressor or compressed air cylinder(s). The user attaches the hose to his or her belt where it can be detached rapidly in an emergency. A flow-control valve or orifice governs the air flow to the user. Exhaled air passes to the ambient atmosphere through a valve or opening in the enclosure (facepiece, helmet, hood or suit). The hose for these respirators may be as long as 300 feet.

Continuous-flow class

Continuous-flow air-line respirators are equipped with a:

- facepiece
- hood **or**
- suit

The respirator must supply at least 115 liters (4 cubit feet) of air per minute to tight-fitting facepieces and 170 liters (six cubic feet) of air per minute to hoods and suits. Suits draw air through a system of internal tubes and valves to the head, trunk, and extremities.

Demand type

Demand air-line respirators are equipped with only a face piece. The demand valve permits air to flow only during inhalation.

Positive Pressure type

Positive pressure air-line respirators are equipped with a face piece. These respirators maintain a positive pressure in the face piece.

Continued on next page

Limitations

Demand air-line respirators produce a negative pressure in the face piece during inhalation, which may allow contaminants in the ambient atmosphere to leak into the air supply. Continuous flow and positive pressure air-line respirators maintain a positive pressure. These respirators provide no protection if the air supply fails.

Air-line suits provide limited protection against atmospheres that irritate the skin or that may be absorbed through the unbroken skin. However, some contaminants, such as tritium, may penetrate the material of an air-line suit and limit its effectiveness, while others, such as fluorine, may react chemically with the material of an airline suit and damage it.

Using a combination air-line respirator with auxiliary self-contained air supply

These respirators equip an air-line respirator with an auxiliary self-contained air supply for escape purposes.

IF the primary air supply fails to operate, **THEN** the wearer switches to the auxiliary self-contained air supply and leaves the hazardous environment.

These devices are approved for both entry into and escape from dangerous atmospheres when equipped with a low-pressure warning alarm and at least 15 minutes self-contained air supply.

Using Respirators in High-Temperature Environments

Purpose

This document outlines:
- the hazards of using respirators in high-temperature environments
- precautions for high-temperature environments
- special equipment available for high-temperature environments
- instructions for storing equipment at high temperatures

Hazard

Persons working in high-temp environments are under stress. Wearing a respirator applies additional stress.

Precaution

Minimize additional stress by using a low-weight respirator offering low resistance to breathing.

Special equipment

Use air-line-type supplied air respirators in high-temp environments. These respirators are equipped with a vortex tube to cool the air supplied to the respirator.

Storing equipment at high temperatures

High-temperature environments may:
- permanently distort the face piece
- cause elastomeric components to deteriorate at an accelerated rate

Inspect and maintain these respirators regularly to prevent deterioration.

Using Respirators in Low Temperature Environments

Purpose

This document describes:
- the hazards of low temperature environments
- precautions for using respirators at lower temperatures
- special equipment available for use in low temperature environments
- requirements for storing respirators at low temperatures

Hazards

Low temperatures may:
- fog the lens in a respiratory-inlet covering
- freeze the exhalation valve in the open or closed position
- cause an improper seal in the exhalation valve
- cause high pressure connections on self-contained breathing apparatus to leak due to metal contraction

Precautions for temperatures approaching 32ºF

Coat the inside surface of the lens to prevent fogging.

Precautions for temperatures below 0ºF

To prevent fogging at temperatures as low as –25ºF:
Use full-face pieces equipped with nose cups that direct the warm and moist exhaled air through the exhalation valve.

To prevent the exhalation valve from freezing open or closed:
Use dry respirable air with an air-line respirator or self-contained breathing apparatus.

To prevent leaks:
Do **not** over-tighten high-pressure connections, since they may break when the apparatus is returned to an atmosphere at normal room temperature.

Special equipment

Some air-line-type supplied-air respirators may be equipped with a vortex tube to warm the air supplied to the respirator-inlet covering.

Some self-contained breathing apparatus models have cold-temperature accessories that may be utilized to overcome these problems. Follow the manufacturer's instructions when using these cold-temperature accessories.

Storing equipment at low temperatures

Emergency-use respirators stored in low-temperature environments may require special elastomeric components that will retain their elasticity at low temps, including:

- regulator diaphragms
- gaskets
- breathing tubes

Face pieces stored in low-temperature environments can become stiff and distorted to a degree that prevents an adequate seal. Use special care to prevent distortion of face pieces stored at low temperatures.

Using Respirators for Emergencies and Rescues

Purpose

This document outlines the procedures for:

- developing the policy for emergency and rescue use of respirators
- entering toxic atmospheres in emergency situations

Developing the policy for emergency and rescue use of respirator

It is not possible to foresee every emergency and rescue use of respirators for every operation. Nevertheless, anticipating the worst possible consequences of particular malfunctions or mishaps can result in adequate protection during emergency and rescue operations.

Use the following procedure to develop written procedures for using respirators in emergency and rescue operations.

Stage	Description

1	Analyze the emergency and rescue use of respirators in each operation by carefully considering:
	• materials
	• equipment processes
	• personnel involved
	• possible consequences of:
	  ❍ equipment or power failures
	  ❍ uncontrolled chemical reactions
	  ❍ fire
	  ❍ explosion
	  ❍ human error

2	A supervisor thoroughly familiar with the particular operation will review the analysis, in light of past occurrences requiring emergency or rescue uses of respirator applications.
3	The supervisor uses the analysis to issue the appropriate number and type of respirators to each area where they may be needed for emergency or rescue use.
4	Supervisors in each work area will maintain and store these respirators so that they are readily accessible and operational when needed.

Entering toxic atmospheres in emergency situations

Use the following recommended procedure to your ERP to rescue personnel from toxic or oxygen-deficient atmospheres. Only trained personnel should handle emergency situations.

Step	Action
1	Obtain the proper protective equipment.
2	Make sure that at least two employees per rig are trained in CPR/FA.
3	Station at least one standby person in a safe area. • activate the ERP developed by the crew
4	Make provisions to relocate the respirator users to a safe environment if necessary, by: • providing the standby person with the proper equipment to assist the respirator user(s) in case of emergency
5	Instruct remaining personnel not to enter the atmosphere.
6	While personnel are in the suspect area, maintain communications between the standby person and the respirator user(s) using: • visual • voice • signal-line • telephone • radio • other suitable means

Maintaining the Respirator

Purpose

This document outlines the procedures for:

- maintaining respirators
- cleaning and sanitizing respirators
- cleaning respirators contaminated with toxic materials
- repairing respirators
- storing respirators

Policy

Perform respirator maintenance regularly to ensure that each respirator user has a clean respirator in good operating condition.

The respirator maintenance program includes:

- cleaning and sanitizing
- inspecting for defects and leaks
- repair or replacement of worn or deteriorated parts
- proper storage

Each respirator will be properly maintained to retain its original shape and effectiveness by each employee designated to use the respirator.

Cleaning and sanitizing

Clean and sanitize the respirator after each use. All users will be trained on the following cleaning and sanitizing procedure. **IF** a respirator is used by more than one employee or is reassigned, **THEN** it must be cleaned and disinfected thoroughly before each use or re-issue.

Step	Action
1	Remove the filters, cartridges, and headbands.
2	Disassemble the major respirator parts.
3	Wash all respirator parts except cartridges and elastic headbands in a cleaner or disinfectant solution at 120ºF. Use a soft hand brush to remove dirt. **IF** a detergent is used, **THEN** immerse the face piece and breathing tube in a disinfectant solution.
4	Rinse completely in clean, warm water to prevent skin irritation.
5	Hand dry masks, then air dry them in a clean area.
6	Clean the remaining respirator parts according to the manufacturer's instructions.
7	Inspect the face shield, respirator valves, headstraps, canisters and filters using the procedures in "Inspecting Respirators." **IF** any parts are defective, **THEN** replace them.

Continued on next page

Step	Action
8	Reassemble the respirator and insert new filters or cartridges. Make sure the seal is tight.
9	Disinfect all facial contact areas by spraying the respirator with an approved disinfectant.
10	Reassemble the respirator and check for detergent residue and leaks.
11	Install new or retested filters, cartridges or canisters.
12	Seal each respirator individually in a sealable plastic bag or container.

Cleaning respirators contaminated with toxic materials

The respirator user should be familiar with the hazards of the materials he/she is using (see the chapter on *Handling Hazardous Materials* in this manual for more information). These hazards, and general protective measures, are found on the Material Safety Data Sheets (MSDS) for the materials. Use the following guidelines to handle respirators contaminated with toxic materials.

IF…	THEN…
the contamination is light,	notify your supervisor and clean the respirator using the cleaning procedure outlined above
Contamination is heavy,	notify your supervisor
There is doubt regarding the degree of contamination,	notify your supervisor
Your supervisor determines that normal cleaning will not provide adequate decontamination,	discard the respirator according to the disposal instructions on the MSDS for the material

Repairing respirators

Only certified personnel may repair respirators or replace parts using parts (NIOSH approved) by the manufacturer or approved vendor.

Do **not** attempt to fit odd-sized non-fitting parts or make repairs beyond the manufacturer's recommendations.

Return reducing or admission valves, regulators, and alarms to the manufacturer or a trained technician for repair or adjustment.

The manufacturer must approve all instrumentation for valve, regulator, and alarm adjustments and tests.

Storing respirators

Store respirators according to manufacturer's instructions when they are not in use.

Do **not** subject the units to temperatures above 120ºF or rough handling. Store respirators to protect them from:

- dust
- sunlight
- extreme heat or cold
- excessive moisture
- damaging chemicals
- distortion of rubber and elastomeric parts

Do **not** store respirators in a locker or toolbox unless they are in carrying cartons.

Pack and store respirators so that the face piece and exhalation valve rest in a near normal position. Label the stored respirator with the date of the inspection and name of the inspector.

IF…	THEN…
the respirator is routinely used,	store it in the clean plastic bag in which it was issued
The respirator is placed at stations and work areas for emergency use only,	store it in carrying cartons or compartments built for the purpose, so that it is accessible at all times and clearly marked

Defective Respirators

Respirators that are found defective by inspection or have defective parts must be taken out of service immediately. The user will be given another respirator (same type) to perform the work task. The defective respirator will be repaired and/or disposed of. The defective respirator should be tagged (Do not use) and taken out of the work place until repairs or disposal can be carried out.

Inspecting Respirators

Purpose

This document outlines the procedure for inspecting respirators.

Policy

Inspect respirators
- routine - before use and during cleaning
- emergency – monthly and before and after each use
- escape only – before being carried into workplace

Supervisors will keep records of inspection dates and findings for emergency respirators.

Procedure

Use the following procedure to inspect the respirators.

Step	Action
1	Check the tightness of the connections.
2	Check the condition of the: • face piece • respiratory-inlet covering • headbands and head harness • valves • connecting tube and canister
3	Check rubber or elastic parts for pliability and deterioration.
4	Check: • harness assemblies • filters, cartridges, and canisters • end-of-service-life indicator • shelf-life date(s)
5	Verify that regulators, alarms and other warning systems are functioning properly.
6	Verify that air and oxygen cylinders are fully charged according to the manufacturer's instructions.
7	**IF** any questionable items are found, **THEN** have them corrected immediately and notify your supervisor. Do **not** use a respirator that is known to be defective in any way.
8	Record the date, findings and remedial actions for each inspection of respirators kept for emergency or rescue use.

Inspecting the rubber valves

Use the following procedure to test rubber valves for deterioration.

Step	Action
1	Roll the inhalation valve between the thumb and forefinger.
2	Drop the valves on a table or flat surface.
3	**IF** the valves do not assume their original shape, **THEN** replace the valve.

Inspecting the 30 minute SCBA

Use the following procedure to inspect the 30-minute SCBA with mode select lever.

Step	Action
1	Open the respirator case and pull the head of the cylinder forward over the edge of the case.
2	Verify that: • the high pressure hose connection is tight on the cylinder fitting • the bypass valve is closed (turned clockwise) • regulator shut-off valve is open (turned counterclockwise) and locked (if the lock is present)
3	Verify that the mode select lever is in the off position (demand mode) to prevent loss of air.
4	Verify that the cylinder pressure gauge reads full. **IF** not, **THEN** recharge or replace the cylinder.
5	Open the cylinder valve and listen and feel for leakage around the packing. **IF** leaking is noticed, **THEN** do **not** use the cylinder until the valve is repaired.
6	Check the regulator and high pressure hose for: • leaks in the hose or at the hose to cylinder valve connection • proper pressure (between 1800 psi and the rated cylinder pressure)

Additional inspections

In addition, inspect the following monthly

- H2S monitors and equipment
- back pack and harness assembly
- cylinder and cylinder valve assembly
- by-pass valve and low-pressure alarm
- diaphragm
- air delivery unit
- mode select unit
- face mask and corrugated breathing tubes
- breathing tube and connector

Use the procedures outlined below.

Inspecting the back pack and harness assembly

Verify that:

- straps are present and in good condition
- all mating ends of the buckles are present and functional
- there are no cracks, missing screws or rivets
- the cylinder is securely bound to the backplate

Inspecting the cylinder and cylinder valve assembly

Verify that:

- there are no dents or gouges in the cylinder metal
- the cylinder valve lock is present
- the cylinder gauge face, needle and lens are in good condition
- the hydrostatic test date is current

IF the cylinder has not been hydrostatically tested within the last five years, **THEN** send the cylinder in for testing.

Inspecting the by-pass valve and low-pressure alarm

The low-pressure alarm warns the user when the air supply is getting low. Use the following procedure to check the by-pass valve and the low-pressure alarm.

Step	Action
1	Close the cylinder valve.
2	Remove the hose from the regulator outlet and verify that there is no obstruction in or over the outlet.
3	Position the regulator so that the gauge can be easily observed.
4	Slowly open the bypass valve. Check that air is flowing from the outlet and the gauge pressure is decreasing immediately. The alarm should sound at a pressure reading between 650 and 550 psi.

Inspecting the diaphragm

To inspect the diaphragm:

1. Place your mouth over the regulator outlet and blow. A positive pressure should be created and maintained for 5-10 seconds without any loss of air.
2. Next, suck on the regulator and hold for 5-10 seconds. Vacuum should remain constant.

IF there is any loss of pressure or vacuum, **THEN** the unit has a leak.

Inspecting the air delivery unit

Open the cylinder valve and suck on the regulator outlet. Air should be delivered with very little effort.

Inspecting mode select units

Use the following procedure to inspect units with a mode select lever.

Step	Action
1	Place your hand over the regulator outlet.
2	Put the lever in the ON position (positive pressure demand mode).
3	Rapidly remove and replace your hand over the outlet.
4	Repeat twice. Air should escape when your hand is removed, indicating a positive pressure in the chamber.
5	Put the lever in the OFF position (demand mode) and remove your hand from the outlet. There should be no air leaking from any area.

Inspecting the face mask and corrugated breathing tubes

Step	Action
1	Check the head harness for damaged serrations and deteriorated rubber
2	Check the face mask body for signs of deterioration or extreme distortion
3	Check the lens for proper seal in the rubber face mask
4	Verify that the retaining clamp is properly in place
5	Check for cracks or large scratches on the lens.
6	Check the exhalation valve for visible deterioration or foreign materials build-up.

Inspecting the breathing tube and connector

Step	Action
1	Stretch the breathing tube and check for deterioration and holes
2	Check the breathing tube connector for good condition of threads and for presence and proper condition of the O-ring or rubber gasket seal.
3	With the facemask held tightly to your face or properly donned, stretch the breathing tube to open the corrugations and place the thumb or hand over the end of the connector.
4	Inhale. Negative pressure should be created inside the mask,

	causing it to pull tightly to the face.

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Step	Action
5	Maintain this negative pressure for 5-10 seconds. **IF** the negative pressure decreases, **THEN** the face mask assembly is not adequate and should not be worn.
6	Reconnect the breathing tube to the regulator. Note: on the Scott Pressure-Pak II and IIA face units, place the connector end of the breathing tube approximately ¼ to ½ inch from the palm of your hand and exhale. **IF** any air returns through the tube, **THEN** do **not** use the mask.

Recordkeeping

Purpose

This document outlines the procedure for record keeping for the respirators program.

Record Keeping

The program administrator will ensure that each area manager maintains and keeps at their yard all records of:

- training
- fit testing
- medical evaluations (questionnaires are confidential)
- copy of the program for all employees to view
- inspection records

(Record keeping of the respirator program and records of medical evaluations will be retained and made available in accordance with 29 CFR 1910.1020.)