HAZWOPER TRAINING
FOR THE PROFESSIONAL

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Contents

(a) Permissible practice
(b) Definitions
(c) Respiratory protection program
(d) Selection of respirators
(e) Medical evaluation
(f) Fit testing
(g) Use of respirators
(h) Maintenance and care of respirators
(i) Breathing air quality
(j) Identification of filters, cartridges, canisters
(k) Training and information
(l) Program evaluation
(m) Recordkeeping
(n) Dates
(o) Appendices

Permissible Practice

Disease Control

- Primary objective - prevention of atmospheric contamination by harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors
- When effective engineering controls are not feasible, appropriate respirators must be used

This notation refers to page and column of Standard in Federal Register, Vol. 63, No. 5, 1-8-98

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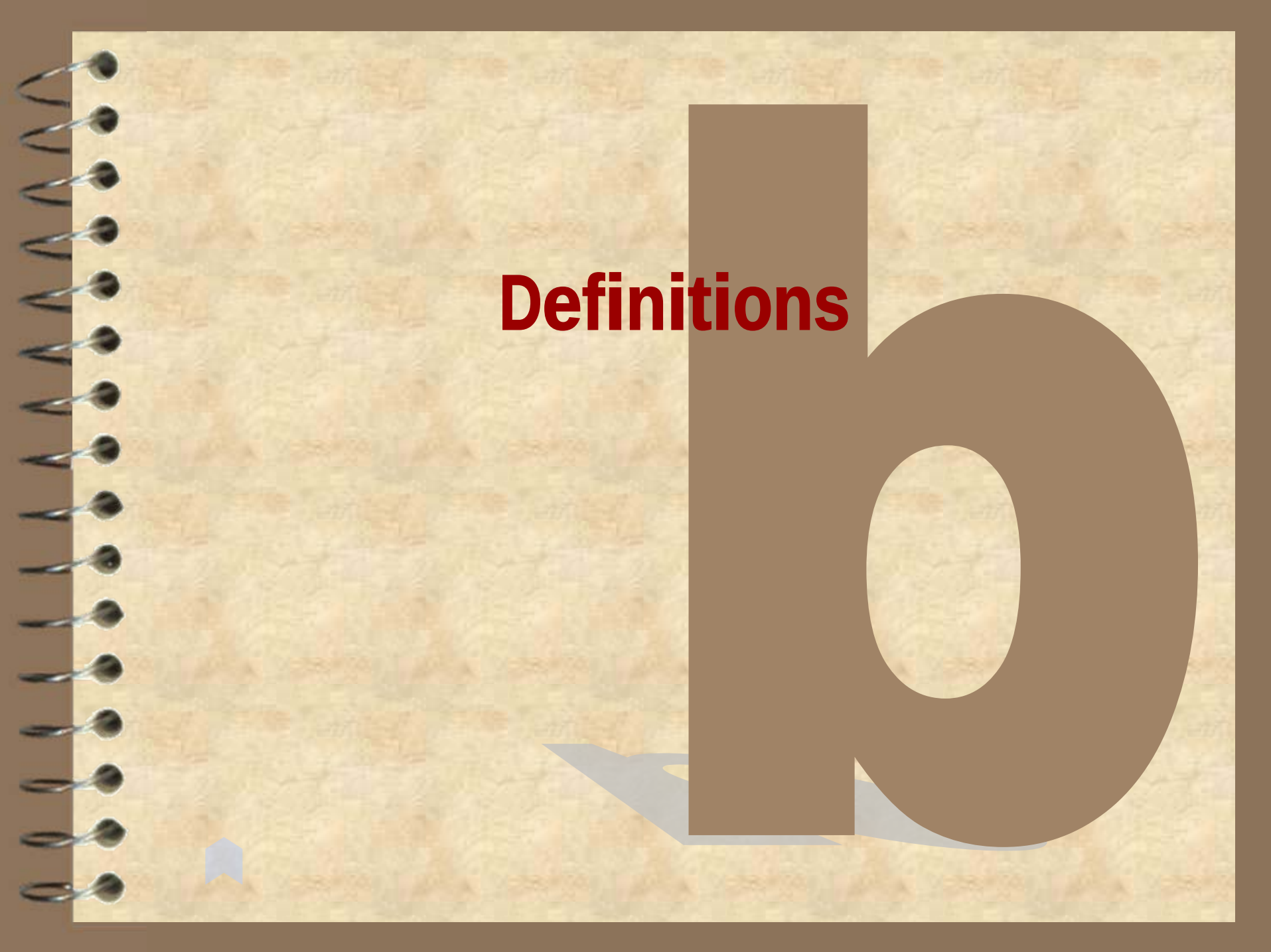
Employer's Responsibilities

- Provide suitable respirators when they are necessary to protect health of employees
- Establish and maintain a respiratory protection program

Definitions



Definitions

- **Air-purifying respirators** - respirator which removes specific contaminants by passing ambient air through a filter, cartridge, or canister
- **Assigned protection factor** - reserved
- **Atmosphere-supplying respirator (ASR)** - a respirator which supplies breathing air from a source independent of the ambient atmosphere, including supplied-air respirators (SAR's) and self-contained breathing apparatus (SCBA's)

Definitions

- **Canister or cartridge** - container with a filter, sorbent, or catalyst which removes specific contaminants from the air passed through the container
- **Demand respirator** - atmosphere-supplying respirator that admits breathing air to the facepiece only when negative pressure is created by inhalation

Definitions

- **Emergency situation** - occurrence such as equipment failure, rupture of containers, or failure of control equipment that results or may result in an uncontrolled significant release of an airborne contaminant
- **Employee exposure** - exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection

Definitions

- **End-of-Service-Life Indicator (ESLI)** - system that warns the user of the approach of the end of adequate respiratory protection, for example: the sorbent is approaching saturation
- **Escape-only respirator** - respirator intended to be used only for emergency exit

Definitions

- **Filter or air purifying element** - a component used in respirators to remove solid or liquid aerosols from inspired air
- **Filtering facepiece (dust mask)** - negative pressure particulate respirator with a filter as an integral part of the facepiece, or with the facepiece composed of the filtering medium

Definitions

- **Fit factor** - quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn
- **Fit test** - use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual

Definitions

- **Helmet** - a rigid respiratory inlet covering that also provides head protection against impact and penetration
- **High efficiency particulate air (HEPA) filter** - a filter that is at least 99.97% effective in removing monodispersive particles of 0.3 micrometers in diameter. Equivalent of NIOSH 42 CFR 84 particulate filters are N100, R100, and P100 filters

Definitions

- **Hood** - respirator inlet covering that completely covers the head and neck and may also cover portions of the upper torso
- **Immediately dangerous to life or health (IDLH)** - an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere

Definitions

- **Interior structural firefighting** - the physical activity of fire suppression, rescue, or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. See 29 CFR 1910.155
- **Loose-fitting facepiece** - a respiratory inlet covering that is designed to form a partial seal with the face

Definitions

- **Maximum use concentration** - reserved
- **Negative pressure respirator (tight-fitting)** - a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator

Definitions

- **Oxygen-deficient atmosphere** - an atmosphere with an oxygen content below 19.5% by volume
- **Physician or other licensed health care professional (PLHCP)** - an individual whose legally permitted scope of practice allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e)

Definitions

- **Positive pressure respirator** - a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator
- **Powered air-purifying respirator (PAPR)** - an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering

Definitions

- **Pressure demand respirator** - a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation
- **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

Definitions

- **Quantitative fit test (QNFT)** - an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage around the respirator
- **Respiratory inlet covering** - that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. May be a facepiece, helmet, hood, suit, or a mouthpiece respirator with a nose clamp

Definitions

- **Self-contained breathing apparatus (SCBA)** - an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user
- **Service life** - the period of time that a respirator, filter, or sorbent, or other respiratory equipment provides adequate protection to the wearer

Definitions

- **Supplied-air respirator (SAR) or airline respirator** - an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user
- **"This section"** - this respiratory protection standard
- **Tight-fitting facepiece** - a respiratory inlet covering that forms a complete seal with the face

Definitions

- **User seal check** - an action conducted by the respirator user to determine if the respirator is properly seated to the face

Respiratory Protection Program

Employer's Responsibilities

- Establish a written program including nine required elements
- Update the written program as necessary

Required Elements

- Procedures for selection
- Medical evaluations of employees required to wear respirators
- Fit testing procedures for tight-fitting respirators
- Procedures for proper use in routine and emergency situations
- Procedures and schedules for inspection, cleaning, and maintenance

Required Elements

- Procedures to ensure proper air quality, quantity, and flow for atmosphere-supplying respirators
- Training of employees in hazards to which they are exposed
- Training of employees in use, donning, doffing, and maintenance of respirators
- Procedures for periodically evaluating program effectiveness

Employer's Responsibilities when respirators are NOT required

- An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that respirator use will not in itself create a hazard
- If employees voluntarily wear respirators, employer must provide a copy of "Information for Employees Using Respirators When Not Required Under the Standard"

Employer's Responsibilities when respirators are NOT required

- Employer must implement those elements of a respiratory program which ensure that an employee is medically able to use that respirator, and that respirator is cleaned, stored, and maintained so that its use does not present a health hazard
  - Exception: a written respiratory protection program is not necessary when only respirators used are filtering facepieces (dust masks)

Selection of Respirators

Employer Responsibilities

- To provide respiratory equipment at no cost to employees
- To provide sufficient models and sizes from which to choose
- To ascertain detailed information about work situation
- To select appropriate respirators according to NIOSH guidelines

Information about Work Situation

- Nature of hazard
- Physical and chemical properties of air contaminant
- Adverse health effects of the hazard
- Hazardous exposure level

Information about Work Situation

- Results of sampling of airborne concentrations of contaminants
- Nature of work
- Period of time respirator will be worn during work shift

Information about Work Situation

- Fit testing results
- Warning properties of hazardous chemical
- Physical characteristic, functional capabilities, and limitations of types of respirators

IDLH Atmospheres

- Employer must provide
  - Full facepiece, pressure-demand SCBA certified by NIOSH for 30 min. minimum service life
  - Combination full facepiece pressure demand SAR with auxiliary self-contained air supply
  - Escape respirators must be certified by NIOSH for the atmosphere in which they will be used
- Oxygen-deficient atmospheres are to be considered IDLH

Non-IDLH Atmospheres

- Employer must provide respirator
  - adequate to protect health of employee
  - that is in compliance with all OSHA and other regulatory requirements
  - appropriate to the contaminant

Respirator Types

- Gases and vapors - respirator must be ASR, or an APR equipped with an ESLI certified by NIOSH for the contaminant
- Particulates - respirator must be ASR, or an APR with HEPA filter certified by NIOSH under 42 CFR Part 84
- Contaminants consisting of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers - an APR with any filter certified by NIOSH for particulates

Altitude and Oxygen Concentration

Ft. above sea level	Minimum O_2 concentration for atmosphere-supplying respirator use
0 to 3000	16-19.5%
3001 to 4000	16.4-19.5%
4001 to 5000	17.1-19.5%
5001 to 6000	17.8-19.5%
6001 to 7000	18.5-19.5%
7001 to 8000	19.3-19.5%

Medical Evaluation

Initial examination

- To determine employee's ability to use a respirator
  - before fit testing or before respirator use is required
  - a physician or other licensed health care professional (PLHCP) must perform an evaluation as specified in Sections 1 and 2, Part A of Appendix C

Examinations

- Provide any necessary follow-up examinations at a convenient time and place
- Provide information about the type and weight of respirator to be used, duration and frequency of respirator use, expected physical work, protective clothing, temperature and humidity extremes, and a copy of the respiratory protection program

Medical determination

- Employer must obtain a written recommendation from the PLHCP, a copy of which must be provided to the employee
- Employer must provide a PAPR if employee is unable to use a negative pressure regulator

Additional medical evaluations

- Mandatory if
  - Employee reports signs or symptoms relating to ability to use a respirator
  - A PLHCP, supervisor, or respiratory program administrator informs employee that he or she needs to be re-evaluated
  - Information from respiratory protection program indicates a need
  - Significant changes occur in workplace conditions

Fit Testing

Tight-fitting facepiece respirators

- Employee must be fit tested with same model, style, and size of respirator that will be used
- Employee must pass a qualitative or quantitative fit test

Re-testing

- Annually
- Whenever changes occur in the wearer's physical condition that could affect fit
  - facial scarring
  - dental changes
  - cosmetic surgery
  - obvious change in body weight
- If wearer feels that fit is unacceptable

Fit test protocols

- Must use an OSHA-accepted QLFT or QNFT, as detailed in Appendix A
- QLFT may be used only for negative pressure air-purifying respirators that must achieve a fit factor of 100 or less

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QNFT passing fit factors

TIGHT-FITTING HALF FACEPIECES

≥ 100

TIGHT-FITTING FULL FACEPIECES

≥ 500

Use of Respirators

Employer responsibilities

- To establish and implement procedures for respirator use
  - prohibiting conditions that may result in facepiece seal leakage
  - preventing employees from removing respirators in hazardous environments
  - ensuring effective respirator operation
  - establishing procedures for IDLH atmospheres or firefighting

Facepiece seal protection

- Employers must prohibit tight-fitting respirators from being worn by employees who have
  - facial hair that interferes with sealing surface or valve function
  - any other condition that interferes with sealing surface or valve function
    - corrective eyeglasses or goggles must not interfere with seal (contact lenses are not mentioned)
    - employees must check seal prior to each use

Continuing respirator effectiveness

- Surveillance of working conditions and degree of employee exposure or stress must be monitored
- When conditions change, the employer must re-evaluate the effectiveness of the respirator

Leaving the respirator area

- Employees must leave the area
  - to wash their faces and facepieces to prevent skin irritation
  - if they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece
  - to replace the respirator, filter, cartridge, or canister elements

IDLH atmospheres

- Employer must ensure that
  - one or more employees is located outside the IDLH atmosphere to maintain communication with employee in IDLH atmosphere
  - outside employees must be trained and equipped to provide emergency rescue
  - employer is notified before entry into the IDLH atmosphere by these rescue personnel
- Employer must provide assistance if rescue is necessary

Rescue equipment

- The employees who are posted outside the IDLH atmosphere must have
  - pressure-demand or positive pressure SCBAs, or a pressure demand or positive pressure SAR-E
  - appropriate retrieval equipment or equivalent

Internal structural firefighting

- Two employees must enter, not one, and remain in contact at all times
- SCBAs must be used for firefighting

Maintenance and Care

Cleaning and Disinfecting

- Employer must provide each user with a respirator that is
  - clean
  - sanitary
  - in good working order
- Appendix B-2 or manufacturer's instructions must be followed

Cleaning & Disinfecting Schedule

- One user - as often as necessary to maintain sanitary condition
- More than one user - must be disinfected before being worn by different individuals
- Emergency use - cleaned and disinfected after each use
- Fit testing respirators - cleaned and disinfected after each use

Storage

- Respirators must be protected from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals
- Facepieces must be stored to prevent deformation of the facepiece and exhalation valve

Storage of Emergency Respirators

- Must be accessible to the work area
- Stored in compartments or covers marked “Emergency Respirators”
- Stored in accordance with manufacturer’s instructions

Inspection - Routine Use

- Respirators used for routine use must be inspected before each use and during cleaning

Inspection - Emergency Use

- Emergency respirators must be
  - inspected at least monthly in accordance with manufacturer's recommendations
  - checked for proper function before and after each use
  - emergency escape-only respirators - inspected before being carried into the workplace for use

Respirator Inspections

- Must include checks of
  - respirator function
  - tightness of connections
  - condition of various parts
    - facepiece
    - head straps
    - valves
    - connecting tube
    - cartridges, canisters, or filters
    - elastomeric parts

Inspection of SCBA's

- Must also include
  - monthly checks of air and oxygen cylinders
    - fully charged
    - recharged at 90% of the manufacturer's recommended pressure level
    - regulator and warning device function

Inspection of Emergency Respirators

- Must also document
  - date of inspection
  - name of person who made inspection
  - findings
  - required remedial action
  - serial number of respirator
- Information must be attached to tag or label on the storage compartment for the respirator, or included in inspection reports

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Repairs

- Employer must ensure that respirators that fail an inspection or are found to be defective are
  - removed from service, and either
    - discarded
    - repaired

Repair Procedures

- Repairs must be made only by individuals who have been appropriately trained
- Only NIOSH-approved respirator parts
- Reducing and admission valves, regulators and alarms must be adjusted only by manufacturer-trained technician

Breathing Air Quality

Standards

- Employer must ensure that compressed and liquid oxygen meet United States Pharmacopoeia requirements
- Compressed breathing air must meet ANSI requirement

Breathing Air Requirements

- Oxygen content 19.5-23%
- Hydrocarbon content 5 mg per m^3 of air or less
- Carbon monoxide content 10 ppm or less
- Carbon dioxide content 1,000 ppm or less
- Lack of noticeable odor

Breathing Air Requirements

- Compressed oxygen must not be used in atmosphere-supplying respirators that have previously used compressed air
- Oxygen concentrations greater than 23% must be used only in equipment designed for oxygen service or distribution

Cylinder Requirements

- Must be tested and maintained as prescribed in Shipping Container Specification Regulations of Department of Transportation, 49 CFR Parts 173 and 178
- Purchased cylinders of breathing air must have a certificate of analysis from the supplier that the air meets requirements for Type 1 - Grade D breathing air

Cylinder Requirements

- Moisture content in the cylinder must not exceed a dew point of -50ºF at 1 atmosphere pressure

Compressors

- Must be constructed and located so that
  - contaminated air does not enter the system
  - moisture content is minimized so that the dew point at 1 atmosphere is 10 ºF below the ambient temperature
  - suitable in-line air-purifying sorbent beds further ensure breathing air quality

Compressors

- Sorbent beds must be maintained and replaced or refurbished following manufacturer's instructions
- A tag containing the most recent change date and signature of person authorized to perform change must be maintained at the compressor

Compressors

- Compressors that are not oil lubricated must have carbon monoxide levels in breathing air less than 10 ppm
- Oil-lubricated compressors must have a high-temperature or carbon monoxide alarm, or both, and have carbon monoxide level less than 10 ppm

Air Couplings

- Breathing air couplings must be incompatible with outlets with nonrespirable worksite air or other gas systems
- No asphyxiating substances may be introduced into breathing air lines
- Breathing gas containers must be marked in accordance with NIOSH Respirator Standard 42 CFR Part 84

Filters, Cartridges, and Canisters

- Employer must ensure that all filters, cartridges and canisters used in the workplace are labeled and color-coded with the NIOSH approved label
- Label must not be removed and must remain legible

Training and Information

Employer Responsibilities

- Provide training program for all employees required to wear respirators
- Training must be conducted prior to requiring the employee to use a respirator, and annually thereafter
- Nature, extent, and effects of respiratory hazards to which employee may be exposed

Training Program

- Explanation of the operation, limitations, and capabilities of the selected respirator(s)
- Instruction in inspection, donning, doffing, checking fit and seals, and wearing
- Employees must have sufficient time to practice
- Training must be “understandable to the employee”

Training Program

- Explanation of maintenance and storage procedures
- Emergency situations and respirator malfunction
- Contents of 29 CFR 1910.134
- Availability of written respirator program

Program Evaluation

Employer Responsibilities

- Review the Respiratory Protection Program at least annually
- Periodically consult employees who use respirators
  - to assess wearer acceptance
  - to elicit feedback

Recordkeeping

Employer Responsibilities

- Maintain accurate record of each employee's medical evaluations
- Make record available to that employee upon request
- Records are to be maintained in accordance with 29 CFR 1910.1020

Dates

Effective date: April 8, 1998

Compliance date: Ocrtober 5, 1998

Appendices

Appendices

- Appendix A - OSHA-approved fit testing procedures
- Appendix B - User seal check procedures
- Appendix C - OSHA respirator medical evaluation questionnaire
- Appendix D - Information for employees using respirators when not required under the Standard (non-mandatory)

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