

Stoughton Utilities



**RESPIRATORY PROTECTION
PROGRAM**

City name: Stoughton	
Program name: Respiratory Protection	
Prepared by: MEUW SERSC	Date: 10-12-2009
Revised by: MEUW SERSC	Date: 10-5-2010
Coordinator: Brian Erickson	
Alternate Coordinator: Roger Thorson	
Assisting Coordinator: Chris Belz MEUW SCRSC	

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Preface

This employee respiratory protection written program has been assembled in an effort to promote safety and health issues in the work place. This program is to be used as a basis to form a proactive Respiratory Protection Program for Stoughton Utilities.

Purpose

This program contains written policies and procedures intended to comply with the Occupational Safety and Health Administration (OSHA) and The Department of Commerce (DCOMM) Respiratory Protection Standard, including guidelines for selection and use of air purifying and air supplying respirators by employees. Its purpose is to safeguard employee health in those cases where respirators are needed to prevent a significant exposure to a work place hazard. Respirators are personal protective devices that are used by employees to safeguard their health. Respirators are meant to be used in those situations where clean, breathable air is needed and engineering controls, such as ventilation and substitution of less toxic materials, are either not possible or not economically feasible. As examples, respirators may be used in temporary situations while new equipment is being installed, corrections are being made to a system, or emergency maintenance is being conducted.

Employee respirators are carefully chosen for the contaminant of concern. Employees will receive training on the respirator care and use as well as the limitations of the chosen respirator. Each employee must be medically evaluated by a physician and fit tested by a qualified person or they will not be allowed to wear a respirator on the job.

In addition, any employee who voluntarily wears a respirator when a respirator is not required(i.e., in certain maintenance, and coating operations) is subject to the medical evaluation, cleaning, maintenance and storage elements of this program and must be provided with certain information specified in this section of the program.*

*Employees who voluntarily wear filtering face pieces (dusk masks) are **not** subject to the medical evaluation, storage, and maintenance provisions of this program.

Specific Employer Responsibilities of the Respiratory Protection Program

- ✓ Establish engineering controls, where feasible, to control contaminated air that causes occupational diseases.
- ✓ Provide a periodic medical evaluation (by a physician) to ensure that each employee is physically able to perform the job.
- ✓ Select the proper respirator based on the hazards of the job.
- ✓ Supply employees with approved respirators, as needed, that provide adequate respirator protection for the particular hazard(s) involved. (Permanently assigned respirators should

be durably marked to identify the employee and a record should be kept of when the respirator was issued.)

- ✓ Provide qualified trainers for employee respirator certification. This includes adequate employee and supervisor training about proper respirator use and limitations.
- ✓ Provide a face piece fit test for negative air respirators.
- ✓ Produce a written Respiratory Protection Program with standard operating procedures (e.g., respirator selection and use) and make it available for review by employees. Regularly inspect and evaluate the program to determine its continued effectiveness.
- ✓ Inspect respirators on a regular and frequent basis to ensure proper care, function, and maintenance. Inspect "emergency" respirators at least once a month and after each use.
- ✓ Insist that employees properly clean, inspect, and store respirators. Respirators used by more than one worker must be cleaned after each use.
- ✓ Provide a clean, convenient, and sanitary location for storage of respirators.
- ✓ Continually evaluate the work area conditions and the degree of employee exposure to chemicals and related stress factors to ensure the chosen respirator is adequate for the job.

Program Administration and Operating Procedures

The Departmental Program Administrator will oversee the program, evaluate it regularly, and work with supervisors to ensure it is being administered effectively. The primary responsibilities of the Program Administrator are to ensure that proper hazard assessment, respirator selection, and employee respirator certifications are conducted and maintained.

Work area supervisors will assist the Program Administrator with the task of implementing and maintaining the Respiratory Protection Program. Supervisor duties include:

1. Helping the Program Administrator select the proper respirator for the job based on the hazard(s) involved.
2. Allowing only approved respirators to be used by employees.
3. Ensure that employee respirators are cleaned and maintained in proper working order.
4. Inspecting employee respirators regularly for proper function.
5. Ensuring that employees receive proper training and a face piece fit test prior to wearing the respirator on the job.
6. Contacting the Program Administrator when questions or problems arise that involve the Respiratory Protection Program.

Employees have the responsibility to wear his/her respirator when and where required and in the manner in which they were trained. Employees must also:

1. Care for and maintain their respirators as instructed and store them in a clean sanitary location.
2. Ensure proper fit by conducting “negative” and “positive” pressure tests each time the mask is donned.
3. Ensure that no facial hair is present where the respirator comes in contact with the face.
4. Inform their supervisors if the respirator no longer fits well and request a new one that fits properly.
5. Inform their supervisors or the Program Administrator of any respiratory hazards which they feel is not adequately addressed in the workplace and any other concerns that they have regarding the program.

Standard operating procedures dealing with respirator limitations, donning procedures, and proper respirator care and use are addressed during employee training sessions. A general outline of the Standard Operating Procedures is given in Appendix I.

Respirator Selection – Hazard Assessment

Hazard assessment will determine respirator selection. The Program Administrator will conduct the hazard assessment for potential contaminants in the work place and determine what type of respirator is to be used. Selection criteria available from the American National Standards Institute (ANSI) are used to determine the proper respirator to be used. Basic respirator selection information is shown in Appendix II.

Supervisors shall ensure that the proper respiratory equipment is available and that employees wear their respirator according to this program. Supervisors shall notify the Program Administrator when the work operation is modified or the workplace hazard changes.

All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and shall be used in accordance with the terms of that certification. In addition, all filters, cartridges, and canisters must be labeled with the appropriate NIOSH approval label. The label must not be removed or defaced while the respirator is in service.

The type and model of respirators selected for specific jobs are shown in Appendix III.

Employees choosing to wear a half face piece APR (Air Purifying Respirator) must comply with the procedure for medical evaluation, respirator use and cleaning, maintenance, and storage.

The Program Administrator shall authorize voluntary use of respiratory protective equipment as requested by all other workers on a case by case basis. This determination depends on specific workplace conditions and the results of the employee’s medical evaluation.

Results from Stoughton Utilities hazard evaluation:

Aluminum Sulfate Solution: Ventilation controls will be used, this will include mechanical ventilation. Because of potential OSHA permissible exposure limits being exceeded, employees responding to a leak or spill must wear a SAR during the performance of this task. **Note:** The definition of a leak or spill is when the OSHA PEL is exceeded and the employee will perform repairs or a cleanup of the chemical substance.

Hydrofluosilicic Acid 23%: Ventilation controls will be used, this will include mechanical ventilation. Because of potential OSHA permissible exposure limits being exceeded, employees responding to a leak or spill must wear a SAR during the performance of this task. **Note:** The definition of a leak or spill is when the OSHA PEL is exceeded and the employee will perform repairs or a cleanup of the chemical substance.

Sodium Hypochlorite 12.5%: Ventilation controls will be used, this will include mechanical ventilation. Because of potential OSHA permissible exposure limits being exceeded, employees responding to a leak or spill must wear a SAR during the performance of this task. **Note:** The definition of a leak or spill is when the OSHA PEL is exceeded and the employee will perform repairs or a cleanup of the chemical substance.

Sewer Gases: Ventilation controls will be used, this will include mechanical ventilation. When controls are not adequate, a SAR during the performance of this task will be used. Entry into confined spaces will not be permitted when flammable gases are at 10% LEL or higher.

Confined Space Rescue: Rescue operations in confined spaces will require a SAR until it is confirmed the air quality is safe.

Updating the Hazard Assessment

The Program Administrator must revise and update the hazard assessment as needed (i.e., anytime work process changes may potentially affect exposure).

- If an employee feels that respiratory protection is needed during a particular activity, he/she is to contact the Program Administrator.
- The Program Administrator will evaluate the potential hazard, arranging for outside assistance as necessary.
- The Program Administrator will then communicate the results of that assessment back to the employees.

If it is determined that respiratory protection is necessary, all other elements of this program will be in effect for those tasks and this program will be updated

Training

Employees who are required to wear a respirator must receive annual training. An example of the employee training outline used for air purifying respirators is given in Appendix IV. A record of employee training is given in Appendix V.

Fit Testing

Employees who wear negative air respirators receive a face piece fit test prior to using the respirator. The specific protocol is determined by the Program Administrator and will be based on the type and limitations of the specific respirator tested. A typical qualitative fit test protocol is shown in Appendix VI. Personnel qualified to perform fit tests are as follows:

Employee	Title
Chris Belz	MEUW SCRSC

Employees will normally receive a face piece fit test on an annual basis unless required more often by a specific OSHA standard or special conditions exist and if there are changes in the employee's physical condition that could affect respiratory fit (i.e. obvious change in body weight, facial scarring and etc.). Respirator fit test records are located in the Safety Coordinator's office. (See appendix VII)

Inspection, Cleaning, Maintenance and Storage

Employees are instructed on the day-to-day care, maintenance, storage, and use of their respirators during the respirator training program. Supervisors will routinely inspect employee respirators to ensure that they are properly used, clean, in good working order, and stored correctly. Emergency respirators are inspected monthly. Other respirator inspections by supervisors are conducted at random. A record of respirator inspections conducted by supervisors shall be kept on file at the Utility office.

Respirators are to be regularly cleaned and disinfected. Respirators issued for the exclusive use of an employee shall be cleaned as often as necessary, after each use and after training. If the respirator is used by more than one employee, the respirator must be cleaned and disinfected before being used by the employee.

Atmosphere supplying and emergency use respirators are to be cleaned and disinfected after each use.

The following procedure is to be used when cleaning and disinfecting respirators:

1. Disassemble respirator as per manufacturer requirements.
2. Wash the facepiece and associated parts in a mild detergent and disinfectant recommended by the manufacturer with warm water.
 - a. Do not use organic solvents.
3. Rinse completely in clean warm water.
4. Air-dry in a clean area.
5. Reassemble the respirator and replace any defective parts.
6. Place in a clean, dry plastic bag or other airtight container.

The Program Administrator will ensure an adequate supply of appropriate cleaning and disinfecting material at the cleaning station. If supplies are low, employees should contact their supervisor, who will inform the Program Administrator.

Respirators are to be properly maintained at all times in order to ensure that they function properly and adequately protect the employee. Maintenance involves a thorough visual inspection for cleanliness and defects. Worn or deteriorated parts will be replaced prior to use.

No components will be replaced or repairs made beyond those recommended by the manufacturer.

Repairs to regulators or alarms of atmosphere-supplying respirators will be conducted by the manufacturer.

The following bullets will be used when inspecting respirators:

- ❖ Facepiece
 - cracks, tears, or holes
 - facemask distortion
 - cracked or loose lenses/faceshield
- ❖ Headstraps
 - breaks or tears
 - broken buckles
- ❖ Valves
 - Residue or dirt
 - Cracks or tears in valve material
- ❖ Air Supply Systems
 - Breathing air quality/grade
 - Condition of supply hoses
 - Hose connections
 - Settings on regulators and valves

Employees are permitted to leave their work area to perform limited maintenance on their respirator in a designated area that is free of respiratory hazards.

These situations include:

- Washing their face and respirator facepiece to prevent any eye or skin irritation
- If Employee detects vapor or gas breakthrough or leakage in the facepiece
- Employee detects any other damage to the respirator or its components

Respirators must be stored in a clean, dry area, and in accordance with the manufacturer recommendations.

Atmosphere supplying respirators will be stored in the following area:

- ❖ SAR's - safety trailer

Defective Respirators

Respirators that are defective or have defective parts shall be taken out of service immediately.

If, during an inspection, an employee discovers a defect in a respirator, he/she is to bring the defect to the attention of the Program Administrator.

The Program Administrator will decide whether to:

- Temporarily take the respirator out of service until it can be repaired
- Perform a simple fix on the spot such as replacing a headstrap
- Dispose of the respirator due to an irreparable problem or defect
 - When a respirator is taken out of service for an extended period of time, the respirator will be tagged out of service, and the employee will be given a replacement of similar make, model, and size
 - All tagged out respirators will be kept in the Program Administrator's office

Medical Review

Employees must be evaluated by a physician to determine if they are physically able to perform their duties while using their selected respirator. The employee medical evaluation is conducted prior to wearing their respirator. Medical evaluation forms are completed by the employee and tests performed are at the discretion of the physician. Only a medically approved employee will be allowed to wear a respirator. An example of the Medical Evaluation Form is found in Appendix VIII.

Medical evaluation procedures are as follows:

- The medical evaluation will be conducted using the questionnaire provided by the licensed physician, which is from the respiratory protection standard.
- The Program Administrator shall provide a copy of this questionnaire to all employees requiring medical evaluations.
- To the extent feasible, the licensed physician will assist employees who are unable to read the questionnaire (by providing help in reading the questionnaire).
- All affected employees will be given a copy of the medical questionnaire to fill out, along with a stamped and addressed envelope for mailing the questionnaire to the physician. Employees will be permitted to fill out the questionnaire on employer time.
- Follow-up medical exams will be granted to employees as required by the standard, and/or as deemed necessary by the licensed physician.
- All employees will be granted the opportunity to speak with the physician about their medical evaluation, if they so request.
- This program, a copy of the Respiratory Protection standard, the list of hazardous substances by work area, and for each employee requiring evaluation: his or her work area or job title, proposed respirator type and weight, length of time required to wear respirator, expected physical work load (light, moderate, or heavy), potential temperature and humidity extremes, and any additional protective clothing required will be given to the physician.

NOTE: Majority of work being performed will be light - moderate with normal temperatures and humidity. Rescue operations are stressful and will require the movement and handling of up to two hundred pounds or more. Fixing leaks or responding to chemical spills can require additional protective clothing (body suits, gloves and boots).

- After an employee has received clearance and begun to wear his or her respirator, additional medical evaluations will be provided under the following circumstances:
 - a. Employee reports signs and/or symptoms related to their ability to use a respirator, such as shortness of breath, dizziness, chest pains, or wheezing
 - b. The physician or supervisor informs the Program Administrator that the employee needs to be reevaluated
 - c. Information from this program, including observations made during fit testing and program evaluation, indicates a need for reevaluation; and
 - d. A change occurs in workplace conditions that may result in an increased physiological burden on the employee.
- All examinations and questionnaires are to remain confidential between the employee and the physician.

Work Area Surveillance

Supervisors will monitor/evaluate the work area to ensure that the worker exposure to chemicals, as well as conditions like stress, work rate, and environmental conditions are within the limitations of the respirator being used. As necessary, air monitoring will be conducted to ensure that the concentration of the chemical contaminant is within the limitations of the respirator

selected.

Air Quality Standards

Air quality standards for air supplied respirators will be maintained as required by the Occupational Safety and Health Administration (OSHA). For SAR's, only grade D breathing air shall be used in the cylinders.

Approved Respirators

Stoughton Utilities shall utilize respirators that are approved by the National Institute of Occupational Safety and Health (NIOSH). Supervisors are responsible for ensuring that only approved respirators are worn by employees.

Respirator Program Standard Operating Procedures

Respirator Inspection and Use

1. Before each use, employees shall inspect the following respirator parts;
 - _ Head straps (elasticity and function).
 - _ Face shield (durability and obstructions).
 - _ Hoses and couplings (cracks and seals).
 - _ Respirator assembly (shape and wear).
 - _ Face piece seal surface (deterioration).
 - _ Inhalation/exhalation valves and seats (seal, cuts and abrasions).
 - _ Cartridge/filter retainers and seating surfaces (proper seal).
 - _ Other inspections as instructed by supervisor.
2. Replace or repair defective respirator parts before the respirator is worn.
3. Wear only clean, sanitized, and approved respirators.
4. Replace filters/cartridges/disposable parts as necessary or instructed.
 - _ Replace filters/cartridges if contaminant breakthrough occurs or if breathing becomes difficult.
5. Don and wear the respirator according to the manufacturer's instructions.
6. Conduct a positive and negative fit test after donning the face piece (correct fit if necessary).
7. Bring damaged or defective respirators/parts to the attention of the supervisor and dispose of properly.

Respirator Storage and Care

1. Clean respirators after each use.
2. Store the respirator in a clean plastic bag or other suitable container. The respirator must be protected from the elements when not in use.
3. Store respirators in a manner that will not deform the face piece or deteriorate the respirator parts.

Respirator Emergency Procedures

Leave the contaminated area if you experience any of the following:

- _ Feeling of illness or dizziness.
- _ Irritation of eyes or breathing airways.
- _ Smelling or tasting the contaminant.
- _ Difficulty breathing
- _ Malfunctioning respirator.

Do not enter the contaminated area until you have checked your respirator and notified your supervisor of the problem.

Respirator Limitations

1. Respirators must not be worn if there is any interference with the face piece seal (eyeglass temple bar, beard (more than one day growth), sideburns, etc.)
2. Air purifying respirators have special limitations. Conditions prohibiting use include:
 - _ Untested confined spaces.
 - _ Oxygen deficient or enriched atmospheres.
 - _ Atmospheres immediately dangerous to life or health (IDLH).
 - _ Contaminants that lack sufficient warning properties.
 - _ Unknown contaminant concentration in air.
 - _ Contaminant concentrations above the maximum use concentration (MUC) of the respirator or cartridge.
3. Respirators must not be modified in any way. Changes make respirator approval invalid.

Supervisor Responsibilities

Supervisors will:

1. Contact the Program Administrator if a hazard assessment is necessary for the condition of respirator use.
2. Inspect employee respirators on a regular basis for proper use, care, and defective parts.
3. Ensure that all respirator users under their direction have received a medical evaluation, an appropriate fit test, and employee training.

Guide for Selection of Respirators

See

American National Standards Institute, Inc.

(ANSI Z 88.2 - 1992)

Respirator Use Jobs and Locations

To provide supervisors with information regarding the correct respirator for a specific task, the list below identifies respirators used for routine work. The list is produced (and updated) by the Program Administrator after conducting the appropriate hazard assessment and selecting the proper respirator.

Location	Job	Respirator (Model/Type)	Hazard(s)
Confined Space	Entry/Rescue	MSA/SAR	Lack of O2
Well Houses	Repair leaks	MSA/SAR	Sodium Hypochlorite 12.5%
Well Houses	Repair leaks	MSA/SAR	Hydrofluosilicic acid 23%
WWTP	Repair leaks	MSA/SAR	Aluminum Sulfate Solution
WWTP/System	Maintenance	MSA/SAR	Sewer Gases (other than flammable)

Respirator Training Outline
Negative Air Purifying Respirators

- I. Purpose of Training
 - A. Safeguarding employee health
 - B. OSHA regulations

- II. Record keeping and required documentation
 - A. Respirator type and hazard involved
 - B. Medical approval

- III. Presentation of topics (or videotape)
 - A. Proper Respirator Usage
 - 1. Limitations of this type of respirator
 - Oxygen deficient atmosphere
 - Protection factor
 - Concentration of contaminants (IDLH and PEL)
 - Types of contaminants
 - 2. Inspection, donning, and self-check fit

 - B. Respirator Specifics
 - 1. Inspection of parts, valves, gaskets, etc.
 - 2. Cleaning, disinfecting, and drying
 - 3. Repairing/replacing defective parts & reassembly
 - 4. Proper care and storage
 - 5. Cartridge/filter care, selection, duration, installation, and use (e.g. color code and contaminant limitations)

- IV. Practical considerations
 - A. Hazard assessment by Program Coordinator
 - B. Interference with the face piece seal
 - C. Practice donning and wearing the respirator
 - D. Answer questions participants may have

- V. Face piece fit test
 - A. Explain procedure
 - B. Determine protocol to be used
 - C. Conduct individual fit tests

- VI. Employee signature and record of information required for certification

FIT TEST PROTOCOL

The fit test begins after the proper respirator has been selected and the employee receives training on his / her respirator. The Employee should have an opportunity to practice putting the respirator on, conduct the positive and negative pressure face piece checks, and wear the respirator in a clean atmosphere for a period of five to ten minutes.

The employee performing the fit test will use irritant smoke, iso-amyl acetate, saccharin, or any other fit test agent allowed by applicable standards. The specific choice of the fit test agent used will be made by the person performing the fit test (after analyzing the nature of the hazard and sensitivity of the person being fit tested). For air purifying respirators, the correct contaminant cartridge is chosen and placed in the respirator to be tested.

The person to be fit tested will normally enter an "enclosure" or wear a "hood" to help concentrate the fit test agent near the face piece seal of the respirator.

While the employee is in the enclosure and wearing the respirator, the person performing the fit test (periodically) directs the fit test agent around and near the respirator face piece. Specific instructions are given to the respirator wearer to test the integrity of the respirator face piece seal. Each of the first five steps is performed for one minute.

Fit test steps

1. Breathing normally.
2. Breathing deeply as with heavy exertion.
3. Breathing normally. Moving head side to side and up and down (somewhat exaggerated).
4. Counting to ten; talking. (A pre-determine passage may be read by the respirator wearer.)
5. Other activities, if applicable. (Jogging in place, smiling, grimacing, etc.)
6. The face piece seal may be broken by the wearer at the conclusion of the fit test to indicate the effectiveness of the respirator.

The fit test will stop if the employee wearing the respirator notices a leak at any time during the test. The employee will readjust the respirator, check cartridge and other seals, and do the positive/negative pressure face piece checks. The test will then be resumed.

No employee will be allowed to wear a negative air respirator unless a satisfactory fit test has been achieved. Those employees successfully passing the fit test will sign and complete the Fit Test Log.

MEDICAL EVALUATION FORM EXAMPLE

Complete the following:

Name: _____
Company: _____
Department: _____
Date of Birth: _____
Home Address: _____
City: _____ State _____ Zip Code _____

Dean Medical Center logo
Place patient label here.
History #: _____
(use only if no patient label)

Appendix C to Section 1910.134:
OSHA Respirator Medical Evaluation Questionnaire (Mandatory)

To the Employee: Please complete Parts A and B.

Can you read (circle one): Yes / No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient for you. To maintain 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) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

- 1. Today's date: _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male / Female
5. Your height: _____ ft. _____ in.
6. Your weight: _____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
9. The best time to phone you at this number: _____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes / No
11. Check the type of respirator you will use (you can check more than one category):
a. _____ N, R or P disposable respirator (filter mask, non-cartridge type only).
b. _____ Other type (for example, half-or-full-facepiece type, powered-air purifying, supplied air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes / No
If "yes", what type(s): _____

Continued [arrow]

Part A. Section 2. (Mandatory) Questions 1-9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

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 problem that you've been told about: Yes / No

If yes, explain _____
4. Do you currently have any of the following symptoms of pulmonary or lung illness?
 - a. Shortness of breath: Yes / No
 - b. Shortness of breath when walking up a slight hill or incline: Yes / No
 - c. Shortness of breath while walking with other people at an ordinary pace on level ground: Yes / No
 - d. Have to stop for breath when walking at your own pace on level ground Yes / No
 - e. Shortness of breath when washing or dressing yourself: Yes / No
 - f. Shortness of breath that interferes with your job: Yes / No
 - g. Coughing that produces phlegm (thick sputum): Yes / No
 - h. Coughing that wakes you early in the morning: Yes / No
 - i. Coughing that occurs mostly when you are lying down: Yes / No
 - j. Coughing up blood in the last month: Yes / No
 - k. Wheezing: Yes / No
 - l. Wheezing that interferes with your job: Yes / No
 - m. Chest pain when you breathe deeply: Yes / No
 - n. Any other symptoms that you think may be related to lung problems: Yes / No

If yes, explain _____

Continued 

5. Have you ever had any of the following cardiovascular or heart problems?
- a. Heart attack: Yes / No
 - b. Stroke: Yes / No
 - c. Angina: Yes / No
 - d. Heart failure: Yes / No
 - e. Swelling in your legs or feet (not caused by walking): Yes / No
 - f. Heart arrhythmia (heart beating irregularly) Yes / No
 - g. High blood pressure: Yes / No
 - h. Any other hear problem that you've been told about: Yes / No

If yes, explain _____

6. Have you ever had any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest: Yes / No
 - b. Pain or tightness in your chest during physical activity: Yes / No
 - c. Pain or tightness in your chest that interferes with your job: Yes / No
 - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes / No
 - e. Heartburn or indigestion that is not related to eating: Yes / No
 - f. Any other symptoms that you think may be related to heart or circulation problems: Yes / No

If yes, explain _____

Do you currently take medication for any of the following problems?

- a. Breathing or lung problems: Yes / No
- b. Heart trouble: Yes / No
- c. Blood pressure: Yes / No
- d. Seizures (fits): Yes / No

8. If you've used a respirator, have you ever had any of the following problems?(If you've never used a respirator, check this box and go to question 9).

- a. Eye irritation: Yes / No
- b. Skin allergies or rashes: Yes / No
- c. Anxiety: Yes / No
- d. General weakness or fatigue: Yes / No
- e. Any other problem that interferes with your use of a respirator: Yes / No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire? Yes / No

Continued 

OSHA Respirator Medical Evaluation Questionnaire
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Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary. (If this does not apply to you, proceed to Part B.)

10. Have you ever lost vision in either eye (temporarily or permanently)? Yes / No
11. Do you currently have any of the following vision problems?
- a. Wear contact lenses: Yes / No
 - b. Wear glasses: Yes / No
 - c. Color blind: Yes / No
 - d. Any other eye or vision problem. Yes / No
12. Have you ever had an injury to your ears, including broken ear drum? Yes / No
13. Do you currently have any of the following hearing problems?
- a. Difficulty hearing: Yes / No
 - b. Wear a hearing aid: Yes / No
 - c. Any other hearing or ear problem: Yes / No
14. Have you ever had a back injury? Yes / No
15. Do you currently have any of the following musculoskeletal problems?
- a. Weakness in any of your arms, hands, legs or feet: Yes / No
 - b. Back pain: Yes / No
 - c. Difficulty fully moving your arms and legs: Yes / No
 - d. Pain or stiffness when you lean forward or backward at the waist: Yes / No
 - e. Difficulty fully moving your head side to side: Yes / No
 - f. Difficulty moving your head up or down: Yes / No
 - g. Difficulty bending at the knees: Yes / No
 - h. Difficulty squatting to the ground: Yes / No
 - i. Climbing a flight of stairs or a ladder carrying more than 25 lbs.: Yes / No
 - j. Any other muscle or skeletal problem that interferes with using a respirator: Yes / No

Part B. Please circle "yes" or "no", write in comments as needed.

1. List any second jobs or side businesses you have: _____

2. List your previous occupations: _____

3. List your current and previous hobbies: _____

4. Have you been in the military services? Yes / No
If "yes", were you exposed to biological or chemical agents (Whether in training or in combat) Yes / No
5. Will you be working under hot or humid conditions? Yes / No
6. Have you ever had heat exhaustion or heat stroke? Yes / No
7. Have you ever worked on a HAZMAT or spill response team? Yes / No

Continued 

8. Do you perform regular work activities that require the use of a respirator to protect you from hazardous chemical exposures? Yes / No
If so, list specific hazardous chemicals, if known _____
-
- (If no current respirator use, answer questions 9 -15 for possible respirator use in the future.)
9. What type of respirator(s) do you wear?
- a. Disposable style, dust/mist: Yes / No
 - b. Negative pressure, cartridge or canister style: Yes / No
 - c. Positive pressure/supplied air: Yes / No
 - d. SCBA/ Self-Contained Breathing Apparatus: Yes / No
10. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?
- a. # times/shift _____ # times/week _____ # times/month _____
 - b. Emergency escape only (no rescue): Yes / No
 - c. Emergency spill response or rescue only: Yes / No
 - d. Confined space entry: Yes / No
11. How long do you wear a respirator at a time?
- a. Less than 6 minutes? Yes / No
 - b. Between 6 - 30 minutes? Yes / No
 - c. More than 30 minutes? Yes / No
12. Have you had any difficulty wearing a respirator since your last evaluation? Yes / No
13. During the period you are using the respirator(s), is your work effort:
- a. Light (e.g., operating equipment while sitting, light assembly): Yes / No
 - b. Moderate (e.g., standing while painting or constructing, carrying 35 lbs.): Yes / No
 - c. Heavy (e.g., climbing ladders with a load, lifting 50 lbs.): Yes / No
14. Will you be wearing protective clothing and/or other equipment (other than the respirator) when you're using your respirator? Yes / No
If "yes", describe this protective clothing and/or equipment: _____
-
15. Describe the work you'll be doing while you're using your respirator(s): _____
-
16. Do you take medications prescribed by a doctor on a regular basis? Yes / No
Please list _____
-
17. Do you have any allergies to bee stings, medicines, food, pollen, hayfever, latex/gloves, etc. Yes / No
If "yes", please list _____

Continued 

OSHA Respirator Medical Evaluation Questionnaire
page 6 of 6

18. Tobacco Use:

- a. Do you currently use tobacco? Yes / No
If "yes", what year did you start? _____
- b. Please describe your current tobacco use:
Cigarettes (packs/day) _____ Cigars (# cigars) _____
Pipe (pipefuls) _____ Chew/Snuff (# occurrences) _____
- c. Have you ever used tobacco products in the past? Yes / No
If "yes", for how many years? _____, what year did you stop? _____
Please describe your past tobacco use:
Cigarettes (packs/day) _____ Cigars (# cigars) _____
Pipe (pipefuls) _____ Chew/Snuff (# occurrences) _____
19. Do you drink alcoholic beverages? Yes / No
If "yes", indicate your approximate weekly intake of each of the following:
Beer (bottles or cans) _____ Liquor (ounces) _____ Wine (glasses) _____
20. Date of last tetanus booster: _____
21. Has there been any significant change in your health over the past year? Yes / No
If "yes", please describe _____

TO BE READ AND SIGNED BY PATIENT:

I hereby certify that the information given by me on this form is true and correct.

Patient's Signature

Date

PHYSICIAN COMMENTS

Physician's Signature

Date



FACE SHEET
for
Fitness to Use a Respirator

Place patient label here or complete the following:
Name
Address
City, State, Zip

Date
DOB
Home Phone #

Employer
Address
Employer Phone #
Job Title

Type of Respirator to be used
Level of work effort when wearing respirator: Light Moderate Heavy
Extent of usage:

- 1. On a daily basis hours / day
2. Occasionally (more than once a week)
3. Rarely (emergency situations only)
4. HAZMAT Participant

Reviewing Physician's Recommendation:
No restrictions on respirator use as described
Restrictions on respirator use as follows
Follow-up respirator evaluation recommended in
Additional recommendations
Reviewing Physician
Date

A copy of this written report has been provided to the employee.

LIST OF REFERENCES

1. American National Standard Practices for Respiratory Protection. American National Standards Institute, Inc. (ANSI Z88.2-1980) See Appendix II.
2. Respiratory Protection. Code of Federal Regulations. Occupational Safety and Health Administration, General Industry Standards (29 CFR 1910.134).
3. Respiratory Protection: An Employer's Manual. National Institute of Occupational Safety and Health (Division of Technical Services). Cincinnati, Ohio. October 1978.



OSHA Regulations (Standards - 29 CFR) Respiratory Protection. - 1910.134

◀ [OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134
- **Standard Title:** Respiratory Protection.
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment
- **Applicable Standard:** Applicable Standard:

Interpretation(s)

This section applies to General Industry (part 1910), Shipyards (part 1915), Marine Terminals (part 1917), Longshoring (part 1918), and Construction (part 1926).

..1910.134(a)

(a)

Permissible practice.

(a)(1)

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(a)(2)

Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program which shall include the requirements outlined in paragraph (c) of this section.

..1910.134(b)

(b)

Definitions. The following definitions are important terms used in the respiratory protection standard in this section.

Air-purifying respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient

air through the air-purifying element.

Assigned protection factor (APF) [Reserved]

Atmosphere-supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or air purifying element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor means a 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 means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means 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.

Interior structural firefighting means 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 means a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC) [Reserved].

Negative pressure respirator (tight fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) 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) of this section.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator means 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) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering means 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. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying

respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

This section means this respiratory protection standard.

Tight-fitting facepiece means a respiratory inlet covering that forms a complete seal with the face.

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

(c)

Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202-219-4667).

(c)(1)

In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

(c)(1)(i)

Procedures for selecting respirators for use in the workplace;

(c)(1)(ii)

Medical evaluations of employees required to use respirators;

(c)(1)(iii)

Fit testing procedures for tight-fitting respirators;

(c)(1)(iv)

Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

(c)(1)(v)

Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

(c)(1)(vi)

Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

(c)(1)(vii)

Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

..1910.134(c)(1)(viii)

(c)(1)(viii)

Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

(c)(1)(ix)

Procedures for regularly evaluating the effectiveness of the program.

(c)(2)

Where respirator use is not required:

(c)(2)(i)

An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in Appendix D to this section ("Information for Employees Using Respirators When Not Required Under the Standard"); and

(c)(2)(ii)

In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

(c)(3)

The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

(c)(4)

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

(d)

Selection of respirators. This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(d)(1)

General requirements.

(d)(1)(i)

The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(d)(1)(ii)

The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(d)(1)(iii)

The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

..1910.134(d)(1)(iv)

(d)(1)(iv)

The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

(d)(2)

Respirators for IDLH atmospheres.

(d)(2)(i)

The employer shall provide the following respirators for employee use in IDLH atmospheres:

(d)(2)(i)(A)

A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

(d)(2)(i)(B)

A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

(d)(2)(ii)

Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

(d)(2)(iii)

All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(d)(3)

Respirators for atmospheres that are not IDLH.

(d)(3)(i)

The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(d)(3)(i)(A)

Assigned Protection Factors (APFs) [Reserved]

(d)(3)(i)(B)

Maximum Use Concentration (MUC) [Reserved]

(d)(3)(ii)

The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(d)(3)(iii)

For protection against gases and vapors, the employer shall provide:

(d)(3)(iii)(A)

An atmosphere-supplying respirator, or

(d)(3)(iii)(B)

An air-purifying respirator, provided that:

(d)(3)(iii)(B)(1)

(1) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

(d)(3)(iii)(B)(2)

If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(d)(3)(iv)

For protection against particulates, the employer shall provide:

(d)(3)(iv)(A)

An atmosphere-supplying respirator; or

(d)(3)(iv)(B)

An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(d)(3)(iv)(C)

For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I. -- Assigned Protection Factors [Reserved]

TABLE II

Altitude (ft.)	Oxygen deficient Atmospheres (% O ₂) for which the employer may rely on atmosphere-supplying respirators
Less than 3,001	16.0-19.5
3,001-4,000	16.4-19.5
4,001-5,000	17.1-19.5
5,001-6,000	17.8-19.5
6,001-7,000	18.5-19.5
7,001-8,000 ¹	19.2-19.5

¹Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

..1910.134(e)

(e)

Medical evaluation. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

(e)(1)

General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

(e)(2)

Medical evaluation procedures.

(e)(2)(i)

The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical

questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

(e)(2)(ii)

The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of this section.

(e)(3)

Follow-up medical examination.

(e)(3)(i)

The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

(e)(3)(ii)

The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

(e)(4)

Administration of the medical questionnaire and examinations.

(e)(4)(i)

The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

(e)(4)(ii)

The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(e)(5)

Supplemental information for the PLHCP.

(e)(5)(i)

The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

(e)(5)(i)(A)

(A) The type and weight of the respirator to be used by the employee;

(e)(5)(i)(B)

The duration and frequency of respirator use (including use for rescue and escape);

(e)(5)(i)(C)

The expected physical work effort;

(e)(5)(i)(D)

Additional protective clothing and equipment to be worn; and

(e)(5)(i)(E)

Temperature and humidity extremes that may be encountered.

(e)(5)(ii)

Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

(e)(5)(iii)

The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

Note to Paragraph (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(e)(6)

Medical determination. In determining the employee's ability to use a respirator, the employer shall:

(e)(6)(i)

Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(e)(6)(i)(A)

Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(e)(6)(i)(B)

The need, if any, for follow-up medical evaluations; and

(e)(6)(i)(C)

A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

(e)(6)(ii)

If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(e)(7)

Additional medical evaluations. At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section

if:

(e)(7)(i)

An employee reports medical signs or symptoms that are related to ability to use a respirator;

(e)(7)(ii)

A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(e)(7)(iii)

Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or

(e)(7)(iv)

A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(f)

Fit testing. This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

(f)(1)

The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

(f)(2)

The employer shall ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

(f)(3)

The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

(f)(4)

If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

..1910.134(f)(5)

(f)(5)

The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of this section.

(f)(6)

QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.

(f)(7)

If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

(f)(8)

Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(f)(1)(8)(i)

Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

(f)(1)(8)(ii)

Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(f)(1)(8)(iii)

Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

(g)

Use of respirators. This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(g)(1)

Facepiece seal protection.

(g)(1)(i)

The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(g)(1)(i)(A)

Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(g)(1)(i)(B)

Any condition that interferes with the face-to-facepiece seal or valve function.

(g)(1)(ii)

If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(g)(1)(iii)

For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1 of this section.

(g)(2)

Continuing respirator effectiveness.

(g)(2)(i)

Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

(g)(2)(ii)

The employer shall ensure that employees leave the respirator use area:

..1910.134(g)(2)(ii)(A)

(g)(2)(ii)(A)

To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(g)(2)(ii)(B)

If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or

(g)(2)(ii)(C)

To replace the respirator or the filter, cartridge, or canister elements.

(g)(2)(iii)

If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(g)(3)

Procedures for IDLH atmospheres. For all IDLH atmospheres, the employer shall ensure that:

(g)(3)(i)

One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(g)(3)(ii)

Visual, voice, or signal line communication is maintained between the employee (s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(g)(3)(iii)

The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(g)(3)(iv)

The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(g)(3)(v)

The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;

(g)(3)(vi)

Employee(s) located outside the IDLH atmospheres are equipped with:

(g)(3)(vi)(A)

Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

(g)(3)(vi)(B)

Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or

(g)(3)(vi)(C)

Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(g)(4)

Procedures for interior structural firefighting. In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure that:

(g)(4)(i)

At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(g)(4)(ii)

At least two employees are located outside the IDLH atmosphere; and

(g)(4)(iii)

All employees engaged in interior structural firefighting use SCBAs.

Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

Note 2 to paragraph (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

(h)

(h) Maintenance and care of respirators. This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

(h)(1)

Cleaning and disinfecting. The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in Appendix B-2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(h)(1)(i)

Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(h)(1)(ii)

Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(h)(1)(iii)

Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(h)(1)(iv)

Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(h)(2)

Storage. The employer shall ensure that respirators are stored as follows:

(h)(2)(i)

All respirators shall be stored to protect them from damage, contamination,

dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(h)(2)(ii)

In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

(h)(2)(ii)(A)

Kept accessible to the work area;

(h)(2)(ii)(B)

Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(h)(2)(ii)(C)

Stored in accordance with any applicable manufacturer instructions.

..1910.134(h)(3)

(h)(3)

Inspection.

(h)(3)(i)

The employer shall ensure that respirators are inspected as follows:

(h)(3)(i)(A)

All respirators used in routine situations shall be inspected before each use and during cleaning;

(h)(3)(i)(B)

All respirators maintained for use in emergency situations shall 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; and

(h)(3)(i)(C)

Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(h)(3)(ii)

The employer shall ensure that respirator inspections include the following:

(h)(3)(ii)(A)

A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

(h)(3)(ii)(B)

A check of elastomeric parts for pliability and signs of deterioration.

(h)(3)(iii)

In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen

cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

(h)(3)(iv)

For respirators maintained for emergency use, the employer shall:

(h)(3)(iv)(A)

Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and

(B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

(h)(4)

Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

(h)(4)(i)

Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;

(h)(4)(ii)

Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(h)(4)(iii)

Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

(i)

Breathing air quality and use. This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

(i)(1)

The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(i)(1)(i)

Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

..1910.134(i)(1)(ii)

(i)(1)(ii)

Compressed breathing air shall meet at least the requirements for Grade D

breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

(i)(1)(ii)(A)

Oxygen content (v/v) of 19.5-23.5%;

(i)(1)(ii)(B)

Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

(i)(1)(ii)(C)

Carbon monoxide (CO) content of 10 ppm or less;

(i)(1)(ii)(D)

Carbon dioxide content of 1,000 ppm or less; and

(i)(1)(ii)(E)

Lack of noticeable odor.

(i)(2)

The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

(i)(3)

The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

(i)(4)

The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(i)(4)(i)

Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);

(i)(4)(ii)

Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(i)(4)(iii)

The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

(i)(5)

The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(i)(5)(i)

Prevent entry of contaminated air into the air-supply system;

(i)(5)(ii)

Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;

(i)(5)(iii)

Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

(i)(5)(iv)

Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

(i)(6)

For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

(i)(7)

For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

(i)(8)

The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

(i)(9)

The employer shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

(j)

Identification of filters, cartridges, and canisters. The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

(k)

Training and information. This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in Appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

(k)(1)

The employer shall ensure that each employee can demonstrate knowledge of at least the following:

..1910.134(k)(1)(i)

(k)(1)(i)

Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(k)(1)(ii)

What the limitations and capabilities of the respirator are;

(k)(1)(iii)

How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(k)(1)(iv)

How to inspect, put on and remove, use, and check the seals of the respirator;

(k)(1)(v)

What the procedures are for maintenance and storage of the respirator;

(k)(1)(vi)

How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(k)(1)(vii)

The general requirements of this section.

(k)(2)

The training shall be conducted in a manner that is understandable to the employee.

(k)(3)

The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.

(k)(4)

An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

(k)(5)

Retraining shall be administered annually, and when the following situations occur:

(k)(5)(i)

Changes in the workplace or the type of respirator render previous training obsolete;

(k)(5)(ii)

Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(k)(5)(iii)

Any other situation arises in which retraining appears necessary to ensure safe respirator use.

(k)(6)

The basic advisory information on respirators, as presented in Appendix D of this section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

(l)

Program evaluation. This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(l)(1)

The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(l)(2)

The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

..1910.134((l)(2)(i)

(i)(2)(i)

Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(i)(2)(ii)

Appropriate respirator selection for the hazards to which the employee is exposed;

(i)(2)(iii)

Proper respirator use under the workplace conditions the employee encounters; and

(i)(2)(iv)

Proper respirator maintenance.

(m)

Recordkeeping. This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

..1910.134(m)(1)

(m)(1)

Medical evaluation. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

(m)(2)**Fit testing.****(m)(2)(i)**

The employer shall establish a record of the qualitative and quantitative fit tests administered to an employee including:

(m)(2)(i)(A)

The name or identification of the employee tested;

(m)(2)(i)(B)

Type of fit test performed;

(m)(2)(i)(C)

Specific make, model, style, and size of respirator tested;

(m)(2)(i)(D)

Date of test; and

(m)(2)(i)(E)

The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

(m)(2)(ii)

Fit test records shall be retained for respirator users until the next fit test is administered.

(m)(3)

A written copy of the current respirator program shall be retained by the employer.

(m)(4)

Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

(n)**Dates.****(n)(1)**

Effective date. This section is effective April 8, 1998. The obligations imposed by this section commence on the effective date unless otherwise noted in this paragraph. Compliance with obligations that do not commence on the effective date shall occur no later than the applicable start-up date.

(n)(2)

Compliance dates. All obligations of this section commence on the effective date except as follows:

..1910.134(n)(2)(i)

(n)(2)(i)

The determination that respirator use is required (paragraph (a)) shall be completed no later than September 8, 1998.

(n)(2)(ii)

Compliance with provisions of this section for all other provisions shall be completed no later than October 5, 1998.

(n)(3)

The provisions of 29 CFR 1910.134 and 29 CFR 1926.103, contained in the 29 CFR parts 1900 to 1910.99 and the 29 CFR part 1926 editions, revised as of July 1, 1997, are in effect and enforceable until October 5, 1998, or during any administrative or judicial stay of the provisions of this section.

(n)(4)

Existing Respiratory Protection Programs. If, in the 12 month period preceding April 8, 1998, the employer has conducted annual respirator training, fit testing, respirator program evaluation, or medical evaluations, the employer may use the results of those activities to comply with the corresponding provisions of this section, providing that these activities were conducted in a manner that meets the requirements of this section.

..1910.134(o)

(o)

Appendices.

(o)(1)

Compliance with Appendix A, Appendix B-1, Appendix B-2, and Appendix C of this section is mandatory.

(o)(2)

Appendix D of this section is non-mandatory and is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

◀ [OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

Complete the following:

Name: _____

Company: _____

Department: _____

Date of Birth: _____

Home Address: _____

City: _____ State _____ Zip Code _____



Place patient label here.

History #: _____

(use only if no patient label)

**Appendix C to Section 1910.134:
OSHA Respirator Medical Evaluation Questionnaire (Mandatory)**

To the Employee: Please complete Parts A and B.

Can you read (circle one): Yes / No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient for you. To maintain 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) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____

2. Your name: _____

3. Your age (to nearest year): _____

4. Sex (circle one): Male / Female

5. Your height: _____ ft. _____ in.

6. Your weight: _____ lbs.

7. Your job title: _____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____

9. The best time to phone you at this number: _____

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes / No

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

a. _____ N, R or P disposable respirator (filter mask, non-cartridge type only).

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

12. Have you worn a respirator (circle one): Yes / No

If "yes", what type(s): _____

Continued

Part A. Section 2. (Mandatory) Questions 1-9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

- 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 problem that you've been told about: Yes / No

If yes, explain _____

- 4. Do you currently have any of the following symptoms of pulmonary or lung illness?
 - a. Shortness of breath: Yes / No
 - b. Shortness of breath when walking up a slight hill or incline: Yes / No
 - c. Shortness of breath while walking with other people at an ordinary pace on level ground: Yes / No
 - d. Have to stop for breath when walking at your own pace on level ground Yes / No
 - e. Shortness of breath when washing or dressing yourself: Yes / No
 - f. Shortness of breath that interferes with your job: Yes / No
 - g. Coughing that produces phlegm (thick sputum): Yes / No
 - h. Coughing that wakes you early in the morning: Yes / No
 - i. Coughing that occurs mostly when you are lying down: Yes / No
 - j. Coughing up blood in the last month: Yes / No
 - k. Wheezing: Yes / No
 - l. Wheezing that interferes with your job: Yes / No
 - m. Chest pain when you breathe deeply: Yes / No
 - n. Any other symptoms that you think may be related to lung problems: Yes / No

If yes, explain _____

5. Have you ever had any of the following cardiovascular or heart problems?

- a. Heart attack: Yes / No
- b. Stroke: Yes / No
- c. Angina: Yes / No
- d. Heart failure: Yes / No
- e. Swelling in your legs or feet (not caused by walking): Yes / No
- f. Heart arrhythmia (heart beating irregularly) Yes / No
- g. High blood pressure: Yes / No
- h. Any other heart problem that you've been told about: Yes / No

If yes, explain _____

6. Have you ever had any of the following cardiovascular or heart symptoms?

- a. Frequent pain or tightness in your chest: Yes / No
- b. Pain or tightness in your chest during physical activity: Yes / No
- c. Pain or tightness in your chest that interferes with your job: Yes / No
- d. In the past two years, have you noticed your heart skipping or missing a beat: Yes / No
- e. Heartburn or indigestion that is not related to eating: Yes / No
- f. Any other symptoms that you think may be related to heart or circulation problems: Yes / No

If yes, explain _____

Do you currently take medication for any of the following problems?

- a. Breathing or lung problems: Yes / No
- b. Heart trouble: Yes / No
- c. Blood pressure: Yes / No
- d. Seizures (fits): Yes / No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check this box and go to question 9).

- a. Eye irritation: Yes / No
- b. Skin allergies or rashes: Yes / No
- c. Anxiety: Yes / No
- d. General weakness or fatigue: Yes / No
- e. Any other problem that interferes with your use of a respirator: Yes / No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire? Yes / No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary. (If this does not apply to you, proceed to Part B.)

- 10. Have you ever lost vision in either eye (temporarily or permanently)? Yes / No
- 11. Do you currently have any of the following vision problems?
 - a. Wear contact lenses: Yes / No
 - b. Wear glasses: Yes / No
 - c. Color blind: Yes / No
 - d. Any other eye or vision problem. Yes / No
- 12. Have you ever had an injury to your ears, including broken ear drum? Yes / No
- 13. Do you currently have any of the following hearing problems?
 - a. Difficulty hearing: Yes / No
 - b. Wear a hearing aid: Yes / No
 - c. Any other hearing or ear problem: Yes / No
- 14. Have you ever had a back injury? Yes / No
- 15. Do you currently have any of the following musculoskeletal problems?
 - a. Weakness in any of your arms, hands, legs or feet: Yes / No
 - b. Back pain: Yes / No
 - c. Difficulty fully moving your arms and legs: Yes / No
 - d. Pain or stiffness when you lean forward or backward at the waist: Yes / No
 - e. Difficulty fully moving your head side to side: Yes / No
 - f. Difficulty moving your head up or down: Yes / No
 - g. Difficulty bending at the knees: Yes / No
 - h. Difficulty squatting to the ground: Yes / No
 - i. Climbing a flight of stairs or a ladder carrying more than 25 lbs.: Yes / No
 - j. Any other muscle or skeletal problem that interferes with using a respirator: Yes / No

Part B. Please circle "yes" or "no", write in comments as needed.

- 1. List any second jobs or side businesses you have: _____

- 2. List your previous occupations: _____

- 3. List your current and previous hobbies: _____

- 4. Have you been in the military services? Yes / No
If "yes", were you exposed to biological or chemical agents (Whether in training or in combat) Yes / No
- 5. Will you be working under hot or humid conditions? Yes / No
- 6. Have you ever had heat exhaustion or heat stroke? Yes / No
- 7. Have you ever worked on a HAZMAT or spill response team? Yes / No

8. Do you perform regular work activities that require the use of a respirator to protect you from hazardous chemical exposures? Yes / No

If so, list specific hazardous chemicals, if known _____

(If no current respirator use, answer questions 9 -15 for possible respirator use in the future.)

9. What type of respirator(s) do you wear?

- a. Disposable style, dust/mist: Yes / No
- b. Negative pressure, cartridge or canister style: Yes / No
- c. Positive pressure/supplied air: Yes / No
- d. SCBA/ Self-Contained Breathing Apparatus: Yes / No

10. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?

- a. # times/shift _____ # times/week _____ # times/month _____
- b. Emergency escape only (no rescue): Yes / No
- c. Emergency spill response or rescue only: Yes / No
- d. Confined space entry: Yes / No

11. How long do you wear a respirator at a time?

- a. Less than 6 minutes? Yes / No
- b. Between 6 - 30 minutes? Yes / No
- c. More than 30 minutes? Yes / No

12. Have you had any difficulty wearing a respirator since your last evaluation? Yes / No

13. During the period you are using the respirator(s), is your work effort:

- a. Light (e.g., operating equipment while sitting, light assembly): Yes / No
- b. Moderate (e.g., standing while painting or constructing, carrying 35 lbs.): Yes / No
- c. Heavy (e.g., climbing ladders with a load, lifting 50 lbs.): Yes / No

14. Will you be wearing protective clothing and/or other equipment (other than the respirator) when you're using your respirator? Yes / No

If "yes", describe this protective clothing and/or equipment: _____

15. Describe the work you'll be doing while you're using your respirator(s): _____

16. Do you take medications prescribed by a doctor on a regular basis? Yes / No

Please list _____

17. Do you have any allergies to bee stings, medicines, food, pollen, hayfever, latex/gloves, etc..... Yes / No

If "yes", please list _____

OSHA Respirator Medical Evaluation Questionnaire

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18. Tobacco Use:

a. Do you currently use tobacco? Yes / No
If "yes", what year did you start? _____

b. Please describe your current tobacco use:
Cigarettes (packs/day) _____ Cigars (# cigars) _____
Pipe (pipefuls) _____ Chew/Snuff (# occurrences) _____

c. Have you ever used tobacco products in the past? Yes / No
If "yes", for how many years? _____, what year did you stop? _____

Please describe your past tobacco use:
Cigarettes (packs/day) _____ Cigars (# cigars) _____
Pipe (pipefuls) _____ Chew/Snuff (# occurrences) _____

19. Do you drink alcoholic beverages? Yes / No
If "yes", indicate your approximate weekly intake of each of the following:

Beer (bottles or cans) _____ Liquor (ounces) _____ Wine (glasses) _____

20. Date of last tetanus booster: _____

21. Has there been any significant change in your health over the past year? Yes / No

If "yes", please describe _____

TO BE READ AND SIGNED BY PATIENT:

I hereby certify that the information given by me on this form is true and correct.

Patient's Signature

Date

PHYSICIAN COMMENTS

Physician's Signature

Date

FACE SHEET
for
Fitness to Use a Respirator

Place patient label here or complete the following:

Name _____

Address _____

City, State, Zip _____

Date _____

DOB _____

Home Phone # _____

Employer _____ Address _____

Employer Phone # _____

Job Title _____

Type of Respirator to be used _____

Level of work effort when wearing respirator: Light _____ Moderate _____ Heavy _____

Extent of usage:

1. On a daily basis _____ hours / day _____
2. Occasionally (more than once a week) _____
3. Rarely (emergency situations only) _____
4. HAZMAT Participant _____

Reviewing Physician's Recommendation:

No restrictions on respirator use as described _____ B-Reader report pending _____

Restrictions on respirator use as follows _____

Follow-up respirator evaluation recommended in _____

Additional recommendations _____

Reviewing Physician _____ Date _____

A copy of this written report has been provided to the employee.

Subpart Z - TOXIC AND HAZARDOUS SUBSTANCES
1910.1000 Air Contaminants

An employee's exposure to any substance listed in Tables Z-1, Z-2, or Z-3 of this section shall be limited in accordance with the requirements of the following paragraphs of this section.

(a) *Table Z-1. (1) Substance with limits preceded by "C"-Ceiling Values.* An employee's exposure to any substance in Table Z-1, the exposure limit of which is preceded by a "C", shall at no time exceed the exposure limit given for that substance. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure which shall not be exceeded at any time during the working day.

(2) *Other substances - 8-hour Time Weighted Averages.* An employee's exposure to any substance in Table Z-1, the exposure limit of which is not preceded by a "C", shall not exceed the 8-hour Time Weighted Average given for that substance in any 8-hour work shift of a 40-hour work week.

(b) *Table Z-2.* An employee's exposure to any substance listed in Table Z-2 shall not exceed the exposure limits specified as follows:

(1) *8-hour time weighted averages.* An employee's exposure to any substance listed in Table Z-2, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that substance in Table Z-2.

(2) *Acceptable ceiling concentrations.* An employee's exposure to a substance listed in Table Z-2 shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the substance in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under "acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift."

(3) *Example.* During an 8-hour work shift, an employee may be exposed to a concentration of Substance A (with a 10 ppm TWA, 25 ppm ceiling and 50 ppm peak) above 25 ppm (but never above 50 ppm) only for a maximum period of 10 minutes. Such exposure must be compensated by exposures to concentrations less than 10 ppm so that the cumulative exposure for the entire 8-hour work shift does not exceed a weighted average of 10 ppm.

(c) *Table Z-3.* An employee's exposure to any substance listed in Table Z-3, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that substance in the table.

(d) *Computation formulae.* The computation formula which shall apply to employee exposure to more than one substance for which 8-hour time weighted averages are listed in subpart Z of 29 CFR part 1910 in order to determine whether an employee is exposed over the regulatory limit is as follows:

$$E=(C_a T_a+C_b T_b+\dots C_n T_n)+8$$

Where:

E is the equivalent exposure for the working shift.

C is the concentration during any period of time T where the concentration remains constant.

T is the duration in hours of the exposure at the concentration C.

The value of E shall not exceed the 8-hour time weighted average specified in subpart Z of 29 CFR part 1910 for the substance involved.

(ii) To illustrate the formula prescribed in paragraph (d)(1)(i) of this section, assume that Substance A has an 8-hour time weighted average limit of 100 ppm noted in Table Z-1. Assume that an employee is subject to the following exposure:

Two hours exposure at 150 ppm

Two hours exposure at 75 ppm

Four hours exposure at 50 ppm

Substituting this information in the formula, we have $(2 \times 150 + 2 \times 75 + 4 \times 50) + 8 = 81.25$ ppm

Since 81.25 ppm is less than 100 ppm, the 8-hour time weighted average limit, the exposure is acceptable.

(2)(i) in case of a mixture of air contaminants an employer shall compute the equivalent exposure as follows: $E_m = (C_1 + L_1 + C_2 + L_2) + \dots (C_n + L_n)$

Where:

E_m is the equivalent exposure for the mixture C is the concentration of a particular contaminant.

L is the exposure limit for that substance specified in subpart Z of 29 CFR part 1910.

The value of E_m shall not exceed unity (1).

(ii) To illustrate the formula prescribed in paragraph (d)(2)(i) of this section, consider the following exposures:

Substance	Actual concentration of 8-hour exposure (ppm)	8-hour TWA PEL (ppm)
B	500	1,000
C	45	200
D	40	200

Substituting in the formula, we have:

$$E_m = 500 + 1000 + 45 + 200 + 40 + 200$$

$$E_m = 0.5000 + 0.225 + 0.200$$

$$E_m = 0.925$$

Since E_m is less than unity (1), the exposure combination is within acceptable limits.

(e) To achieve compliance with paragraphs (a) through (d) of this section, administrative or engineering controls must first be determined and implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with 1910.134.

(f) *Effective dates.* The exposure limits specified have been in effect with the method of compliance specified in paragraph (e) of this section since May 29, 1971.

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Acetaldehyde	75-07-0	200	360	
Acetic acid	64-19-7	10	25	
Acetic anhydride	108-24-7	5	20	
Acetone	67-64-1	1000	2400	
Acetonitrile	75-05-8	40	70	
2-Acetylaminofluorine; see 1910.1014	53-96-3			
Acetylene dichloride; see 1,2-Dichloroethylene				
Acetylene tetrabromide	79-27-6	1	14	
Acrolein	107-02-8	0.1	025	
Acrylamide	79-06-1	.....	0.3	X
Acrylonitrile; see 1910.1045	107-13-1			
Aldrin	309-00-2	.....	0.25	X
Allyl alcohol	107-18-6	2	5	X
Allyl chloride	107-05-1	1	3	
Allyl glycidyl ether (AGE)	106-92-3	(C)10	(C)45	
Allyl propyl disulfide	2179-59-1	2	12	
alpha-Alumina	1344-28-1			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Aluminum, metal (as Al)	7429-90-5			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
4-Aminodiphenyl; see 1910.1011	92-67-1			
2-Aminoethanol; see Ethanolamine				
2-Aminopyridine	504-29-0	0.5	2	
Ammonia	7664-41-7	50	35	
Ammonium sulfamate	7773-06-0			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
n-Amyl acetate	628-63-7	100	525	
sec-Amyl acetate	626-38-0	125	650	
Aniline and homologs	62-53-3	5	19	X
Anisidine (o-, p-isomers)	29191-52-4	.....	0.5	X
Antimony and compounds (as Sb)	7440-36-0	.....	0.5	
ANTU (alpha Naphthylthiourea)	86-88-4	.....	0.3	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Arsenic, inorganic compounds (as As); see 1910.1018	7440-38-2			
Arsenic, organic compounds (as As);	7440-38-2	.....	0.5	
Arsine	7784-42-1	0.05	0.2	
Asbestos; see 1910.1001	(⁺)			
Azinphos-methyl	86-50-0	.....	0.2	X
Barium, soluble compounds (as Ba)	7440-39-3	.....	0.5	
Barium sulfate	7727-43-7			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Benomyl	17804-35-2			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Benzene; see 1910.1028	71-43-2			
See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028 ^d				
Benzidine; see 1910.1010	92-87-5			
p-Benzoquinone; see Quinone.				
Benzo(a)pyrene; see Coal tar pitch volatiles				
Benzoyl peroxide	94-36-0	.....	5	
Benzyl chloride	100-44-7	1	5	
Beryllium and beryllium compounds (as Be)..	7440-41-7		(²)	
Biphenyl; see Diphenyl				
Bismuth telluride, Undoped	1304-82-1			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Boron oxide	1303-86-2			
Total dust .....		.....	15	
Boron trifluoride	7637-07-2	(C)1	(C)3	
Bromine	7726-95-6	0.1	0.7	
Bromoform	75-25-2	0.5	5	X
Butadiene (,3-Butadiene)	106-99-0	1000	2200	
Butanethiol; see Butyl mercaptan .				
2-Butanone (Methyl ethyl ketone)	78-93-3	200	590	
2-Butoxyethanol	111-76-2	50	240	X

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
n-Butyl-acetate	123-86-4	150	710	
sec-Butyl acetate	105-46-4	200	950	
tert-Butyl acetate	540-88-5	200	950	
n-Butyl alcohol	71-36-3	100	300	
sec-Butyl alcohol	75-92-2	150	450	
tert-Butyl alcohol	75-65-0	100	300	
Butylamine	100-73-9	(C)5	(C)15	X
tert-Butyl chromate (as Cr ₂ O ₃)	1189-85-1	.....	(C)0.1	X
n-Butyl glycidyl ether (BGE)	2426-08-6	50	270	
Butyl mercaptan	109-79-5	10	35	
p-tert-Butyltoluene	98-51-1	10	60	
Cadmium (as Cd); see 1910.1027	7440-43-9			
Calcium carbonate	1317-65-3			
Total Dust			15	
Respirable fraction			5	
Calcium hydroxide	1305-62-0			
Total Dust			15	
Respirable fraction			5	
Calcium oxide	1305-78-8		5	
Calcium silicate	1344-95-2			
Total dust			15	
Respirable fraction			5	
Calcium sulfate	7778-18-9			
Total dust			15	
Respirable fraction			5	
Camphor, synthetic	76-22-2		2	
Carbaryl (Sevin)	63-25-2		5	
Carbon black	1333-86-4		3.5	
Carbon dioxide	124-38-9	5000	9000	
Carbon disulfide	75-15-0		(²)	
Carbon monoxide	630-08-0	50	55	
Carbon tetrachloride	56-23-5		(²)	
Cellulose	9004-34-6			
Total dust			15	
Respirable fraction			5	
Chlordane	57-74-9		0.5	X
Chlorinated camphene	8001-35-2		0.5	X
Chlorinated diphenyl oxide	55720-99-5		0.5	X

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Chlorine	7782-50-5	(C)1	(C)3	
Chlorine dioxide	10049-04-4	0.1	0.3	
Chlorine trifluoride	7790-91-2	(C)0.1	(C)0.4	
Chloroacetaldehyde	107-20-0	(C)1	(C)3	
a-Chloroacetophenone (Phenacyl chloride) ..	532-27-4	0.05	0.3	
Chlorobenzene	108-90-7	75	350	
o-Chlorobenzylidene malononitrile	2698-41-1	0.05	0.4	
Chlorobromomethane	74-97-5	200	1050	
2-Chloro-1,3-butadiene; see beta-Chloroprene.				
Chlorodiphenyl (42% Chlorine)(PCB)	53469-21-9	.....	1	X
Chlorodiphenyl (54% Chlorine)(PCB)	11097-69-1	.....	0.5	X
1-Chloro-2,3-epoxypropane; see Epichlorohydrin.				
2-Chloroethanol; see Ethylene chlorohydrin.				
Chloroethylene; see Vinyl chloride.				
Chloroform (Trichloromethane)	67-66-3	(C)50	(C)240	
bis(Chloromethyl) ether; see 1910.1008	542-88-1			
Chloromethyl methyl ether; see 1910.1006 ...	107-30-2			
1-Chloro-1-nitropropane	600-25-9	20	100	
Chloropicrin	76-06-2	0.1	0.7	
beta-Chloroprene	126-99-8	25	90	X
2-Chloro-6-(trichloromethyl) pyridine	1929-82-4			
Total dust			15	
Respirable fraction			5	
Chromic acid and chromates (as CrO ₃)	(⁴)		(²)	
Chromium (II) compounds. (as Cr)	7440-47-3		0.5	
Chromium (III) compounds. (as Cr)	7440-47-3		0.5	
Chromium metal and insol. salts (as Cr)	7440-47-3		1	
Chrysene; see Coal tar pitch volatiles.				
Clopidol	2971-90-6			
Total dust			15	
Respirable fraction			5	
Coal dust (less than 5% SiO ₂), respirable fraction			(³)	
Coal dust (greater than or equal to 5% SiO ₂), respirable fraction.			(³)	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP, phenanthrene, acridine, chrysene, pyrene.	65966-93-2	.....	0.2	
Cobalt metal, dust, and fume (as Co)	7440-48-4	.....	0.1	
Coke oven emissions; see 1910.1029.				
Copper	7440-50-8			
Fume (as Cu) .....		.....	0.1	
Dusts and mists (as Cu) .....		.....	1	
Cotton dust °; see 1910.1043		.....	1	
Crag herbicide (Sesone)	136-78-7			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Cresol, all isomers	1319-77-3	5	22	X
Crotonaldehyde	123-73-9; 4170-30-3	2	6	
Cumene	98-82-8	50	245	X
Cyanides (as CN)	(⁺)	5	
Cyclohexane	110-82-7	300	1050	
Cyclohexanol	108-93-0	50	200	
Cyclohexanone	108-94-1	50	200	
Cyclohexene	110-83-8	300	1015	
Cyclopentadiene	542-92-7	75	200	
2,4-D (Dichlorophenoxyacetic acid)	94-75-7	.....	10	
Decaborane	17702-41-9	0.05	0.3	X
Demeton (Systox)	8065-48-3	.....	0.1	X
Diacetone alcohol (4-Hydroxy-4-methyl-2-pentanone)	123-42-2	50	240	
1,2-Diaminoethane; see Ethylenediamine.				
Diazomethane	334-88-3	0.2	0.4	
Diborane	19287-45-7	0.1	0.1	
1,2-Dibromo-3-chloropropane (CBCP); see 1910.1044	96-12-8			
1,2-Dibromoethane; see Ethylene dibromide.				
Dibutyl phosphate	107-66-4	1	5	
Dibutyl phthalate	84-74-2	.....	5	
o-Dichlorobenzene	95-50-1	(C)50	(C)300	
p-Dichlorobenzene	106-46-7	75	450	
3,3'-Dichlorobenzidine; see 1910.1007	91-94-1			

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Dichlorodifluoromethane	75-71-8	1000	4950	
1,3-Dichloro-5,5-dimethyl hydantoin	118-52-5	.....	0.2	
Dichlorodiphenyltrichloroethane (DDT)	50-29-3	.....	1	X
1,1-Dichloroethane	75-34-3	100	400	
1,2-Dichloroethane; see Ethylene dichloride				
1,2-Dichloroethylene	540-59-0	200	790	
Dichloroethyl ether	111-44-4	(C)15	(C)90	X
Dichloromethane; see Methylene chloride				
Dichloromonofluoromethane	75-43-4	1000	4200	
1,1-Dichloro-1-nitroethane	594-72-9	(C)10	(C)60	
1,2-Dichloropropane; see Propylene dichloride				
Dichlorotetrafluoroethane	76-14-2	1000	7000	
Dichlorvos (DDVP)	62-73-7	.....	1	X
Dicyclopentadienyl iron	102-54-5			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Dieldrin	60-57-1	.....	0.25	X
Diethylamine	109-89-7	25	75	
2-Diethylaminoethanol	100-37-8	10	50	X
Diethyl ether; see Ethyl ether.				
Difluorodibromomethane	75-61-6	100	860	
Diglycidyl ether (DGE)	2238-07-5	(C)0.5	(C)2.8	
Dihydroxybenzene; see Hydroquinone.				
Diisobutyl ketone	108-83-8	50	290	
Diisopropylamine	108-18-9	5	20	X
4-Dimethylaminoazobenzene; see 1910.1015	60-11-7			
Dimethoxymethane; see Methylal.				
Dimethyl acetamide	127-19-5	10	35	X
Dimethylamine	124-40-3	10	18	
Dimethylaminobenzene; see Xylidine.				
Dimethylaniline (N,N-Dimethylaniline)	121-69-7	5	25	X
Dimethylbenzene; see Xylene.				
Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate	300-76-5	.....	3	
Dimethylformamide	68-12-2	10	30	X
2,6-Dimethyl-4-heptanone; see Diisobutyl ketone				
1,1-Dimethylhydrazine	57-14-7	0.5	1	X

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Dimethylphthalate	131-11-3	.....	5	
Dimethyl sulfate	77-78-1	1	5	X
Dinitrobenzene (all isomers)			1	X
(ortho)	528-29-0			
(meta)	99-65-0			
(para)	100-25-4			
Dinitro-o-cresol	534-52-1	.....	0.2	X
Dinitrotoluene	25321-14-6	.....	1.5	X
Dioxane (Diethylene dioxide)	123-91-1	100	360	X
Diphenyl (Biphenyl)	92-52-4	0.2	1	
Diphenylmethane diisocyanate; see Methylene bisphenyl isocyanate.				
Dipropylene glycol methyl ether	34590-94-8	100	600	X
Di-sec octyl phthalate (Di-(2-ethylhexyl) phthalate)	117-81-7	.....	5	
Emery	12415-34-8			
Total dust			15	
Respirable fraction			5	
Endosulfan	115-29-7	.....	0.1	X
Endrin	72-20-8	.....	0.1	X
Epichlorohydrin	106-89-8	5	19	X
EPN	2104-64-5	.....	0.5	X
1,2-Epoxypropane; see Propylene oxide.				
2,3-Epoxy-1-propanol; see Glycidol.				
Ethanethiol; see Ethyl mercaptan.				
Ethanolamine	141-43-5	3	6	
2-Ethoxyethanol (Cellosolve)	110-80-5	200	740	X
2-Ethoxyethyl acetate (Cellosolve acetate) ..	111-15-9	100	540	X
Ethyl acetate	141-78-6	400	1400	
Ethyl acrylate	140-88-5	25	100	X
Ethyl alcohol (Ethanol)	64-17-5	1000	1900	
Ethylamine	75-04-7	10	18	
Ethyl amyl ketone (5-Methyl-3-heptanone) ..	541-85-5	25	130	
Ethyl benzene	100-41-4	100	435	
Ethyl bromide	74-96-4	200	890	
Ethyl butyl ketone (3-Heptanone)	106-35-4	50	230	
Ethyl chloride	75-00-3	1000	2600	
Ethyl ether	60-29-7	400	1200	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Ethyl formate	109-94-4	100	300	
Ethyl mercaptan	75-08-1	(C)10	(C)25	
Ethyl silicate	78-10-4	100	850	
Ethylene chlorohydrin	107-07-3	5	16	X
Ethylenediamine	107-15-3	10	25	
Ethylene dibromide	106-93-4		(²)	
Ethylene dichloride (1,2-Dichloroethane) ...	107-06-2		(²)	
Ethylene glycol dinitrate	628-96-6	(C)0.2	(C)1	X
Ethylene glycol methyl acetate; see Methyl cellosolve acetate				
Ethyleneimine; see 1910.1012	151-56-4			
Ethylene oxide; see 1910.1047	75-21-8			
Ethylidene chloride; see 1,1-Dichloroethane				
N-Ethylmorpholine	100-74-3	20	94	X
Ferbam	14484-64-1			
Total dust			15	
Ferrovandium dust	12604-58-9		1	
Fluorides (as F)	(⁴)		2.5	
Fluorine	7782-41-4	0.1	0.2	
Fluorotrichloromethane (Trichlorofluoromethanes)	75-69-4	1000	5600	
Formaldehyde; see 1910.1048	50-00-0			
Formic acid	64-18-6	5	9	
Furfural	98-01-1	5	20	X
Furfuryl alcohol	98-00-0	50	200	
Grain dust (oat, wheat, barley)			10	
Glycerin (mist)	56-81-5			
Total dust			15	
Respirable fraction			5	
Glycidol	556-52-5	50	150	
Glycol monoethyl ether; see 2-Ethoxyethanol .				
Graphite, natural, respirable dust	7782-42-5		(³)	
Graphite, synthetic				
Total dust			15	
Respirable fraction			5	
Guthion; see Azinphos methyl .				
Gypsum	13397-24-5			

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Hafnium	7440-58-6	.....	0.5	
Heptachlor	76-44-8	.....	0.5	X
Heptane (n-Heptane)	142-82-5	500	2000	
Hexachloroethane	67-72-1	1	10	X
Hexachloronaphthalene	1335-87-1	.....	0.2	X
n-Hexane	110-54-3	500	1800	
2-Hexanone (Methyl n-butyl ketone)	591-78-6	100	410	
Hexone (Methyl isobutyl ketone)	108-10-1	100	410	
sec-Hexyl acetate	108-84-9	50	300	
Hydrazine	302-01-2	1	1.3	X
Hydrogen bromide	10035-10-6	3	10	
Hydrogen chloride	7647-01-0	(C)5	(C)7	
Hydrogen Cyanide	74-90-8	10	11	X
Hydrogen fluoride (as F)	7664-39-3		(²)	
Hydrogen peroxide	7722-84-1	1	1.4	
Hydrogen selenide (as Se)	7783-07-5	0.05	0.2	
Hydrogen sulfide	7783.06-4		(²)	
Hydroquinone	123-31-9	.....	2	
Iodine	7553-56-2	(C)0.1	(C)1	
Iron oxide fume	1309-37-1	.....	10	
Isoamyl acetate	123-92-2	100	525	
Isoamyl alcohol (primary and secondary) ...	123-51-3	100	360	
Isobutyl acetate	110-19-0	150	700	
Isobutyl alcohol	78-83-1	100	300	
Isophorone	78-59-1	25	140	
Isopropyl acetate	108-21-4	250	950	
Isopropyl alcohol	67-63-0	400	980	
Isopropylamine	75-31-0	5	12	
Isopropyl ether	108-20-3	500	2100	
Isopropyl glycidyl ether (IGE)	4016-14-2	50	240	
Kaolin	1332-58-7			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Ketene	463-51-4	0.5	0.9	
Lead, inorganic (as Pb); see 1910.1025	7439-92-1			
Limestone	1317-65-3			

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Lindane	58-89-9	.....	0.5	X
Lithium hydride	7580-67-8	.....	0.025	
L.P.G. (Liquefied petroleum gas)	68476-85-7	1000	1800	
Magnesite	546-93-0			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Magnesium oxide fume	1309-48-4			
Total particulate .....		.....	15	
Malathion	121-75-5			
Total dust .....		.....	15	X
Maleic anhydride	108-31-6	0.25	1	
Manganese compounds (as Mn)	7439-96-5	.....	(C)5	
Manganese fume (as Mn)	7439-96-5	.....	(C)5	
Marble	1317-65-3			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Mercury (aryl and inorganic) (as Hg)	7439-97-6		(²)	
Mercury (organo) alkyl compounds (as Hg)	7439-97-6		(²)	
Mercury (vapor) (as Hg)	7439-97-6		(²)	
Mesityl oxide	141-79-7	25	100	
Methanethiol; see Methyl mercaptan.				
Methoxychlor	72-43-5			
Total dust .....		.....	15	
2-Methoxyethanol (Methyl cellosolve)	109-96-4	25	80	X
2-Methoxyethyl acetate (Methyl cellosolve acetate)	110-49-6	25	120	X
Methyl acetate	79-20-9	200	610	
Methyl acetylene (Propyne)	74-99-7	1000	1650	
Methyl acetylene-propadiene mixture (MAPP)		1000	1850	
Methyl acrylate	96-33-3	10	35	X
Methylal (Dimethoxy-methane)	109-87-5	1000	3100	
Methyl alcohol	67-56-1	200	260	
Methylamine	74-89-5	10	12	
Methyl amyl alcohol; see Methyl isobutyl carbinol.				
Methyl n-amyl ketone	110-43-0	100	465	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Methyl bromide	74-83-9	(C)20	(C)80	X
Methyl butyl ketone; see 2-Hexanone.				
Methyl cellosolve; see 2-Methoxyethanol.				
Methyl cellosolve acetate; see 2-Methoxyethyl acetate.				
Methyl chloride	74-87-3		(²)	
Methyl chloroform (1,1,1-Trichloroethane)	71-55-6	350	1900	
Methylcyclohexane	108-87-2	500	2000	
Methylcyclohexanol	25639-42-3	100	470	
o-Methylcyclohexanone	583-60-8	100	460	X
Methylene chloride	765-09-2		(²)	
Methyl ethyl ketone (MEK); see 2-Butanone				
Methyl formate	107-31-3	100	250	
Methyl hydrazine (Monomethyl hydrazine) ..	60-34-4	(C)0.2	(C)0.35	X
Methyl iodide	74-88-4	5	28	X
Methyl isoamyl ketone	110-12-3	100	475	
Methyl isobutyl carbinol	108-11-2	25	100	X
Methyl isobutyl ketone; see Hexone .				
Methyl isocyanate	624-83-9	0.02	0.05	X
Methyl mercaptan	74-93-1	(C)10	(C)20	
Methyl methacrylate	80-62-6	100	410	
Methyl propyl ketone; see 2-Pentanone.				
alpha-Methyl styrene	98-83-9	(C)100	(C)480	
Methylene bisphenyl isocyanate (MDI)	101-68-8	(C)0.02	(C)0.2	
Mica; see Silicates.				
Molybdenum (as Mo)	7439-98-7			
Soluble compounds			5	
Insoluble Compounds				
Total dust			15	
Monomethyl aniline	100-61-8	2	9	X
Monomethyl hydrazine; see Methyl hydrazine.				
Morpholine	110-91-8	20	70	X
Naphtha (Coal tar)	8030-30-6	100	400	
Naphthalene	91-20-3	10	50	
alpha-Naphthylamine; see 1910.1004	134-32-7			
beta-Naphthylamine; see 1910.1009	91-59-8			
Nickel carbonyl (as Ni)	13463-39-3	0.01	0.007	
Nickel, metal and insoluble compounds (as Ni)	7440-02-0		1	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Nickel, soluble compounds (as Ni)	7440-02-0	.....	1	
Nicotine	54-11-5	.....	0.5	X
Nitric acid	7697-37-2	2	5	
Nitric oxide	10102-43-9	25	30	
p-Nitroaniline	100-01-6	1	6	X
Nitrobenzene	98-95-3	1	5	X
p-Nitrochlorobenzene	100-00-5	.....	1	X
4-Nitrodiphenyl; see 1910.1003	92-93-3			
Nitroethane	79-24-3	100	310	
Nitrogen dioxide	10102-44-0	(C)5	(C)9	
Nitrogen trifluoride	7783-54-2	10	29	
Nitroglycerin	55-63-0	(C)0.2	(C)2	X
Nitromethane	75-52-5	100	250	
1-Nitropropane	108-03-2	25	90	
2-Nitropropane	79-46-9	25	90	
N-Nitrosodimethylamine; see 1910.1016.				
Nitrotoluene (all isomers)		5	30	X
o-isomer	88-72-2			
m-isomer	90-08-1			
p-isomer	99-99-0			
Nitrotrichloromethane; see Chloropicrin.				
Octachloronaphthalene	2234-13-1	.....	0.1	X
Octane	111-65-9	500	2350	
Oil mist, mineral	8012-95-1	.....	5	
Osmium tetroxide (as Os)	20816-12-0	.....	0.002	
Oxalic acid	144-62-7	.....	1	
Oxygen difluoride	7783-41-7	0.05	0.1	
Ozone	10028-15-6	0.1	0.2	
Paraquat, respirable dust	4685-14-7; 1910-42-5; 2074-50-2	.....	0.5	X
Parathion	56-38-2	.....	0.1	X
Particulates not otherwise regulated (PNOR) ^f				
Total dust			15	
Respirable fraction			5	
PCB; see Chlorodiphenyl (42% and 54% chlorine).				
Pentaborane	19624-22-7	0.005	0.01	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Pentachloronaphthalene	1321-64-8	.....	0.5	X
Pentachlorophenol	87-86-5	.....	0.5	X
Pentaerythritol	115-77-5			
Total dust			15	
Respirable fraction			5	
Pentane	109-66-0	1000	2950	
2-Pentanone (Methyl propyl ketone)	107-87-9	200	700	
Perchloroethylene (Tetrachloroethylene)	127-18-4		(²)	
Perchloromethyl mercaptan	594-42-3	0.1	0.8	
Perchloryl fluoride	7616-94-6	3	13.5	
Perlite	94763-70-3			
Total dust			15	
Respirable fraction			5	
Petroleum distillates (Naphtha) (Rubber Solvent)		500	2000	
Phenol	108-95-2	5	19	X
p-Phenylene diamine	106-50-3	.....	0.1	X
Phenyl ether, vapor	101-84-8	1	7	
Phenyl ether-biphenyl mixture, vapor		1	7	
Phenylethylene; see Styrene.				
Phenyl glycidyl ether (PGE)	122-60-1	10	60	
Phenyldiazine	100-63-0	5	22	X
Phosdrin (Mevinphos)	7786-34-7	.....	0.1	X
Phosgene (Carbonyl chloride)	75-44-5	0.1	0.4	
Phosphine	7803-51-2	0.3	0.4	
Phosphoric acid	7664-38-2	.....	1	
Phosphorus (yellow)	7723-14-0	.....	0.1	
Phosphorus pentachloride	10026-13-8	.....	1	
Phosphorus pentasulfide	1314-80-3	.....	1	
Phosphorus trichloride	7719-12-2	0.5	3	
Phthalic anhydride	85-44-9	2	12	
Picloram	1918-02-1			
Total dust			15	
Respirable fraction			5	
Picric acid	88-89-1	.....	0.1	X
Pindone (2-Pivalyl-1,3-indandione)	83-16-1	.....	0.1	
Plaster of Paris	26499-65-0			
Total dust			15	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Respirable fraction .....		.....	5	
Platinum (as Pt)	7440-06-4			
Metal .....		.....	.....
Soluble salts .....		.....	0.002	
Portland cement	65997-15-1			
Total dust			15	
Respirable fraction .....		.....	5	
Propane	74-98-6	1000	1800	
beta-Propiolactone; see 1910.1013	57-57-8			
n-Propyl acetate	109-60-4	200	840	
n-Propyl alcohol	71-23-8	200	500	
n-Propyl nitrate	627-13-4	25	110	
Propylene dichloride	78-87-5	75	350	
Propylene imine	75-55-8	2	5	X
Propylene oxide	75-56-9	100	240	
Propyne; see Methyl acetylene.				
Pyrethrum	8003-34-7	.....	5	
Pyridine	110-86-1	5	15	
Quinone	106-51-4	0.1	0.4	
RDX; see Cyclonite.				
Rhodium (as Rh), metal fume and insoluble compounds	7440-16-6	.....	0.1	
Rhodium (as Rh), soluble compounds	7440-16-6	.....	0.001	
Ronnel	299-84-3	.....	15	
Rotenone	83-79-4	.....	5	
Rouge				
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Selenium compounds (as Se)	7782-49-2	.....	0.2	
Selenium hexafluoride (as Se)	7783-79-1	0.05	0.4	
Silica, amorphous, precipitated and gel	112926-00-8		(³)	
Silica, amorphous, diatomaceous earth, containing less than 1% crystalline silica ..	61790-53-2		(³)	
Silica, crystalline cristobalite, respirable dust	14464-46-1		(³)	
Silica, crystalline quartz, respirable dust	14808-60-7		(³)	
Silica, crystalline tripoli (as quartz), respirable dust	1317-95-9		(³)	
Silica, crystalline tridymite, respirable dust ..	15468-32-3		(³)	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Silica, fused, respirable dust	60676-86-0		(³)	
Silicates (less than 1% crystalline silica)				
Mica (respirable dust)	12001-26-2		(³)	
Soapstone, total dust .....	.....		(³)	
Soapstone, respirable dust .....	.....		(³)	
Talc (containing asbestos); use asbestos limit; see 29 CFR 1910.1001. ....	.....		(³)	
Talc (containing no asbestos), respirable dust	14807-96-6		(³)	
Tremolite, asbestiform; see 1910.1001.				
Silicon	7440-21-3			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Silicon carbide	409-21-2			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Silver, metal and soluble compounds (as Ag)	7440-22-4	.....	0.01	
Soapstone; see Silicates.				
Sodium fluoroacetate	62-74-8	.....	0.05	X
Sodium hydroxide	1310-73-2	.....	2	
Starch	9005-25-8			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Stibine	7803-52-3	0.1	0.5	
Stoddard solvent	8052-41-3	500	2900	
Strychnine	57-24-9	.....	0.15	
Styrene	100-42-5		(²)	
Sucrose	57-50-1			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Sulfur dioxide	7446-09-5	5	13	
Sulfur hexafluoride	2551-62-4	1000	6000	
Sulfuric acid	7664-93-9	.....	1	
Sulfur monochloride	10025-67-9	1	6	
Sulfur pentafluoride	5714-22-7	0.025	0.25	
Sulfuryl fluoride	2699-79-8	5	20	
Systox; see Demeton.				
2,4,5-T (2,4,5-trichlorophenoxyacetic acid)	93-76-5	.....	10	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Talc; see Silicates.				
Tantalum, metal and oxide dust	7440-25-7	.....	5	
TEDP (Sulfotep)	3689-24-5	.....	0.2	X
Tellurium and compounds (as Te)	13494-80-9	.....	0.1	
Tellurium hexafluoride (as Te)	7783-80-4	0.02	0.2	
Temephos	3383-96-8			
Total dust			15	
Respirable fraction			5	
TEPP (Tetraethyl pyrophosphate)	107-49-3	.....	0.5	X
Terphenyls	26140-60-3	(C)1	(C)9	
1,1,1,2-Tetrachloro-2,2-difluoroethane	76-11-9	500	4170	
1,1,1,2-Tetrachloro-1,2-difluoroethane	76-12-0	500	4170	
1,1,2,2-Tetrachloroethane	79-34-5	5	35	X
Tetrachloroethylene; see Perchloroethylene.				
Tetrachloromethane; see Carbon tetrachloride.				
Tetrachloronaphthalene	1335-88-2	.....	2	X
Tetraethyl lead (as Pb)	78-00-2	.....	0.075	X
Tetrahydrofuran	109-99-9	200	590	
Tetramethyl lead (as Pb)	75-74-1	.....	0.075	X
Tetramethyl succinonitrile	3333-52-6	0.5	3	X
Tetranitromethane	509-14-8	1	8	
Tetryl (2,4,6-Trinitrophenylmethylnitramine) ..	479-45-8	.....	1.5	X
Thallium, soluble compounds (as Tl)	7440-28-0	.....	0.1	X
4,4'-Thiobis (6-tert, Butyl-m-cresol)	96-69-5			
Total dust			15	
Respirable fraction			5	
Thiram	137-26-8	.....	5	
Tin, inorganic compounds (except oxides) (as Sn)	7440-31-5	.....	2	
Tin, organic compounds (as Sn)	7440-31-5	.....	0.1	
Titanium dioxide	13463-67-7			
Total dust			15	
Toluene	108-88-3		(²)	
Toluene-2,4-diisocyanate (TDI)	584-84-9	(C)0.02	(C)0.14	
o-Toluidine	95-53-4	5	22	X
Taxaphene; see Chlorinated camphene.				
Tremolite; see Silicates.				
Tributyl phosphate	126-73-8	.....	5	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
1,1,1-Trichloroethane; see Methyl chloroform.				
1,1,2-Trichloroethane	79-00-5	10	45	X
Trichloroethylene	79-01-6		(²)	
Trichloromethane; see Chloroform.				
Trichloronaphthalene	1321-65-9	.....	5	X
1,2,3-Trichloropropane	96-18-4	50	300	
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1000	7600	
Triethylamine	121-44-8	25	100	
Trifluorobromomethane	75-63-8	1000	6100	
2,4,6-Trinitrophenyl; see Picric acid.				
2,4,6-Trinitrophenylmethylnitramine; see Tetryl.				
2,4,6-Trinitrotoluene (TNT)	118-96-7	.....	1.5	X
Triorthocresyl phosphate	78-30-8	.....	0.1	
Triphenyl phosphate	115-86-6	.....	3	
Turpentine	8006-64-2	100	560	
Uranium (as U)	7440-61-1			
Soluble compounds			0.05	
Insoluble compounds			0.05	
Vanadium	1314-62-1			
Respirable dust (as V ₂ O ₅)			(C)0.5	
Fume (as V ₂ O ₅)			(C)0.1	
Vegetable oil mist				
Total dust			15	
Respirable fraction			5	
Vinyl benzene; see Styrene.				
Vinyl chloride; see 1910.1017	75-01-4			
Vinyl cyanide; see Acrylonitrile.				
Vinyl toluene	25013-15-4	100	480	
Warfarin	81-81-2	.....	0.1	
Xylenes (o-, m-, p-isomers)	1330-20-7	100	435	
Xylidine	1300-73-8	5	25	X
Yttrium	7440-65-5	.....	1	
Zinc chloride fume	7646-85-7	.....	1	
Zinc oxide fume	1314-13-2	.....	5	
Zinc oxide	1314-13-2			
Total dust			15	
Respirable fraction			5	

Substance	CAS No. (c)	ppm(a) ¹	mg/m ³ (b) ¹	Skin designation
Zinc stearate	557-05-1			
Total dust .....		.....	15	
Respirable fraction .....		.....	5	
Zirconium compounds (as Zr)	7440-67-7	.....	5	

¹ The PELs are 8-hour TWAs unless otherwise noted; a (C) designation denotes a ceiling limit.

They are to be determined from breathing-zone air samples.

(a) Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 torr.

(b) Milligrams of substance per cubic meter of air. When entry is in this column only, the value is exact; when listed with a ppm entry, it is approximate.

(c) The CAS number is for information only. Enforcement is based on the substance name. For an entry covering more than one metal compound, measured as the metal, the CAS number for the metal is given - not CAS numbers for the individual compounds.

(d) The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except in some circumstances the distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures; for the excepted subsegments, the benzene limits in Table Z-2 apply. See 1910.1028 for specific circumstances.

(e) This 8-hour TWA applies to respirable dust as measured by a vertical elutriator cotton dust sampler or equivalent instrument. The time-weighted average applies to the cotton waste processing operations of waste recycling (sorting, blending, cleaning and willowing) and garnetting. See also 1910.1043 for cotton dust limits applicable to other sectors.

(f) All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by the Particulates Not Otherwise Regulated (PNOR) limit which is the same as the inert or nuisance dust limit of Table Z-3.

² See Table Z-2.

³ See Table Z-3.

⁴ Varies with compound.

TABLE Z-2

Substance	8-hour time weighted average	Acceptable ceiling concentration	Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	
			Concentration	Maximum duration
Benzene ^a (Z37.40-1969)	10ppm	25 ppm	50 ppm	10 minutes
Beryllium and beryllium compounds(Z37.29-1970)	2ug/m ³	5 ug/m ³	25 ug/m ³	30 minutes
Cadmium fume ^b (Z37.29-1970) .	0.1 mg/m ³	0.3 mg/m ³	.....
Cadmium dust ^b (Z37.5-1970)	0.2 mg/m ³	0.6 mg/m ³		
Carbon disulfide (Z37.3-1968) ..	20 ppm	30 ppm	100 ppm	30 minutes
Carbon tetrachloride (Z37.17-1967)	10 ppm	25 ppm	200 ppm	5 min. in any 4 hrs.
Chromic acid and chromates (Z37.7-1971) .....	.....	1 mg/10m ³		
Ethylene dibromide (Z37.31-1970)	20 ppm	30 ppm	50 ppm	5 minutes
Ethylene dichloride (Z37.28-1969)	2.5 mg/m ³			
Formaldehyde; see 1910.1048 ...				
Hydrogen fluoride (Z37.28-1969)	3 ppm			
Hydrogen sulfide (Z37.2-1966) ..		20 ppm	50 ppm	10 minutes once, only if no other meas. exp. occurs
Mercury (Z37.8-1971)		1 mg/10m ³		
Methyl chloride (Z37.18-1969) .	100 ppm	200 ppm	300 ppm	5 mins. in any 3 hrs.
Methylene chloride (Z37.23-1969)	500 ppm	1,000 ppm	2,000 ppm	5 mins. in any 2 hrs.
Organo (alkyl) mercury (Z37.30-1969)	0.01 mg/m ³	0.04 mg/m ³		

Substance	8-hour time weighted average	Acceptable ceiling concentration	Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	
			Concentration	Maximum duration
Styrene (Z37.15-1969)	100 ppm	200 ppm	600 ppm	5 mins. in any 3 hrs.
Tetrachloroethylene (Z37.22-1967)	100 ppm	200 ppm	300 ppm	5 mins. in any 3 hrs.
Toluene (Z37.12.1967)	200 ppm	300 ppm	500 ppm	10 minutes
Trichloroethylene (Z37.19-1967)	100 ppm	200 ppm	300 ppm	5 mins. in any 2 hrs.

^a This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the benzene standard at 1910.1028.

^b This standard applies to any operations or sectors for which the Cadmium standard, 1910.1027, is stayed or otherwise not in effect.

TABLE Z-3 MINERAL DUSTS

Substance	mppcf ^a	mg/m ³
Silica:		
Crystalline		
Quartz (Respirable)	250b	10mg/m ^{3e}
	<hr/>	<hr/>
	% SiO ₂ + 5	% SiO ₂ +2
		30 mg/m ³
Quartz (Total Dust)		<hr/>
		% SiO ₂ +2
Cristobalite: Use 1/2 the value calculated from the count or mass formulae for quartz		
Tridymite: Use 1/2 the value calculated from the formulae for quartz		
		80 mg/m ³
Amorphous, including natural diatomaceous earth	20	<hr/>
		%SiO ₂
Silicates (less than 1% crystalline silica):		
Mica	20	
Soapstone	20	
Talc (not containing asbestos)	20 ^e	
Talc (containing asbestos) Use asbestos limit.		
Tremolite, asbestiform (see 29 CFR 1910.1001).		
Portland cement	50	
Graphite (Natural)	15	
Coal Dust:		
		2.4 mg/m ^{3e}
Respirable fraction less than 5% SiO ₂		<hr/>
		%SiO ₂ + 2
		10 mg/m ^{3e}
Respirable fraction greater than 5% SiO ₂		<hr/>
		%SiO ₂ + 2

Substance	mppcf ^a	mg/m ³
Inert or Nuisance Dust: ^d		
Respirable fraction	15	5 mg/m ³
Total dust	50	15 mg/m ³

Note-Conversion factors - mppcf x 35.3 = million particles per cubic meter = particles per c.c.

^a Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

^b The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

^c Containing less than 1% quartz; if 1% quartz or more, use quartz limit.

^d All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.

^e Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent Passing Selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC (now NRC) instrument. The respirable fraction of coal dust is determined with an MRD; the figure corresponding to that of 2.4 mg/m³ in the table for coal dust is 4.5 mg/m³.