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Douglas County Safety
6 Admin Friendly

Douglas County

SECTION 1. WRITTEN RESPIRATORY PROTECTION PROGRAM

Introduction

This written program establishes policies and procedures for the effective use of respirators to protect Douglas County employees from airborne contaminant exposures. These procedures are mandatory. This written program is based upon the respirator requirements under Oregon Occupational Safety and Health Administration's rules 1910.134 - Respiratory Protection.

Responsibilities

Department	Supply the required respirator, replacement parts, cartridges, filters, and appropriate cleaning solutions.
Supervisors/Safety Manager	Provide training in the maintenance and use of the respirators and will audit work sites for compliance with the requirements for the use of respirators. Supervisors are also responsible to ensure employees wear appropriate respiratory protection.
Employees	Wear an approved respirator, properly fitted at all times while performing an operation defined as hazardous.

Selection of Respirators

Only the National Institute of Occupational Safety and Health (NIOSH) approved respirators have been selected for use. The following Respiratory Protection Selection Guide shows the type of respirator in relationship to the chemical/operations and condition of use.

These respirators have been chosen based on the type of hazard and the type of protection given by the selected respiratory equipment. Different sizes and styles of respirators are available. The specific selection will be based on the fit testing protocols to determine the best style for each employee to ensure proper fit and comfort.

The use life of each respirator or cartridges will vary depending on the job duties and actual time in use. Each respirator will have some limitations, thus manufacturer instructions and recommendations must be referred to. Air purifying respirators (disposable mask, half or full face piece cartridge respirators) **cannot be used in confined spaces where the environment may have less than 19.5% oxygen or in fumigation operations.**

TABLE 1 - RESPIRATORY PROTECTION SELECTION GUIDE

<u>TASK</u>	<u>HAZARD</u>	<u>TYPE OF REQUIRED RESPIRATOR</u>
Abrasive Blasting	Dust/toxic metals	<i>Silica Abrasive</i> : Air line with abrasive blasting helmet/hood
Welding & Cutting cartridge	Fumes, gases	Half-face piece respirator with fume or air-line respirator
Spray Painting (organic solvents paints)	Vapors/Mists	Half-face piece with organic cartridge and paint spray mist over filter or Airline system depending on type of paint. Note: if lead based paint must use a combination HEPA and organic vapor cartridge.
Road Dust/Construction Surfacing Activities	Dust	Depending on levels from total or toxic dust disposable respirator, half-mask face piece respirator with dust filter or HEPA cartridge.
Asphalt Fumes	Hydrocarbon Fumes	Fume cartridge half-mask and/or organic vapor cartridge (non-cancer form)
Herbicides/Pesticides <input type="checkbox"/> Mixing or, <input type="checkbox"/> If specifically required on MSDS's	Depends on formulation <input type="checkbox"/> Dust <input type="checkbox"/> Mists/Vapors	CURRENT MATERIALS DO NOT REQUIRE RESPIRATORS Note: Check MSDS of new Herbicides
Sweepers and other construction or lawn maintenance equipment (i.e. mowers)	Dust	Depending on levels from total or toxic dust disposable respirator and half-face piece dust/mist or HEPA cartridge.

Vehicle Exhaust (i.e. in tunnels, sand sheds, or poor ventilated shops) complex mixtures)	Carbon monoxide (CO) Diesel emissions (CO, oxides of nitrogen and	Airline respirators or special approved gas masks with end-of-service life indicators.
Confined space entry	Toxic Atmosphere O2 deficiency Possible IDHL	If IDLH environment a minimum of 5 min. escape cylinder is required to be worn in conjunction with the airline
Emergency Fire Response	Toxic Atmosphere	Self-Contained Breathing Apparatus (SCBA) O2 deficiency, dust Smoke, Possible IDHL

<u>TASK</u>	<u>HAZARD</u>	<u>TYPE OF REQUIRED RESPIRATOR</u>
Striper Painting (organic solvents paints)	Vapors/Mists	Half or full face piece with organic cartridge and paint spray mist over filter or airline system depending on type of paint. Note: if lead based paint must use a combination HEPA and organic vapor cartridge at a minimum.

NOTES:

<input type="checkbox"/>	Lead based paints require air-line supply for paint or abrasive blasting		
<input type="checkbox"/>	All types of respirator selected must be NIOSH/MSHA approved for the hazard		
<input type="checkbox"/>	For tasks involving airborne contaminants which are not listed, contact supervisor or safety manager before beginning work		
<input type="checkbox"/>	See:	Appendix 1	for Explanation on Cartridge and Filter selection
		Appendix 2	on Compressed Air Quality for airline or self-contained breathing apparatus
		Appendix 3	on Assigned Protection Factors

Availability and Use of Respirators

When required to wear a respirator, each employee shall wear an approved respirator selected for the hazard the person is exposed to. The respirator must be properly worn and fitted at all times while performing job operations defined as hazardous.

Each employee that needs a respirator will be issued one by the supervisor or safety manager with proper replacement parts, cartridges and filters, and cleaning materials. The supervisor is responsible to see that employees are provided respirators when they are required by this policy.

DOUGLAS COUNTY HAS VARIOUS RESPIRATORS AVAILABLE FOR USE. THE SPECIFIC RESPIRATORS FOR EACH DEPARTMENT VARY. THE TYPES INCLUDE:

<input type="checkbox"/>	Dust and mist disposable mask
<input type="checkbox"/>	Half-face respirator with filters and chemical cartridges.
<input type="checkbox"/>	Full-face respirator with filters and chemical cartridges.
<input type="checkbox"/>	Air-supplied respirators include air lines and self-contained breathing apparatus (SCBA).

Supervisors are responsible to see that the proper replacement parts, cartridges and filters are available and will be issued as requested by the employee.

Each employee shall wear a properly fitted respirator while performing an operation defined as hazardous in TABLE 1. Employees must wear a respirator when in the immediate area where another employee is performing a hazardous operation. To aid in defining this area it will normally be within 10 feet for more than five minutes. This definition would not apply in cases where regulated areas are established for lead or asbestos or other chemical exposures.

Respirator requiring a tight face fit shall not be worn when conditions prevent a good face seal. Such conditions may be:

<input type="checkbox"/>	The growth of a beard and/or sideburns
<input type="checkbox"/>	A skull cap that projects under the face piece
<input type="checkbox"/>	Temple pieces on glasses

The selection of respirators that are not listed in TABLE 1 should be based on information from the chemical material safety data sheet (MSDS), safety equipment supplier and safety manager.

Availability of Respirators for Comfort - BUT not Required

Respirators are available to employees for comfort and not under mandatory overexposure situations. In these cases the following must be required to meet Oregon OSHA basic regulations:

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<input type="checkbox"/>	Ensure the employee is medically able to use the respirator.
<input type="checkbox"/>	Select respirators to match the type of contaminate.
<input type="checkbox"/>	Instruct employee on how to wear and maintain the respirator.
<input type="checkbox"/>	Regardless of the use reason for the respirator, they must be maintained in a clean and sanitary manner and properly stored

The County requires that any employee using a respirator voluntarily be 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 employee. The County will not require detailed fit testing for employees who only wear respirators for comfort and not as a health hazard safety device. As a result it is critical that supervisors and the safety manager evaluate all situations where respirators are being worn to determine the level of program need.

****Exception:** Employees voluntarily using filtering face pieces (dust masks) for their own comfort where no particulate air contaminate exceeds permissible exposure levels, will be exempt from the provisions of this program.

Training of Employees

Each respirator user will be trained on how to use and maintain the respirator based on this program. The training will be given by supervisor, safety manager or knowledgeable person. Refresher training will be done every year or when employee changes type of respirator or as otherwise needed to ensure that the respirator program is followed and understood.

A record will be kept of those employees who have been trained. Each user must understand and apply the contents of this respirator program to the daily use, care and storage of the equipment.

To insure the availability of this program, copies are located in each unit. Employees will be informed where copies are available.

Fitting of Respirators

Prior to fit-testing an employee must undergo a medical evaluation, provided by the County, to determine the employee's ability to use a respirator. Employees not capable of wearing a negative pressure respirator will not be assigned job tasks requiring respirator use.

Proper fitting of respirators is essential if employees are to receive the necessary protection from the airborne contaminate hazards. Air which passes around the face piece of the respirator, rather than through it, is not being filtered. In order to ensure that a good face seal can be achieved, the respirator needs to be carefully fitted.

The following procedures will be followed to fit the initial wearer and then to be used each time the respirator is used: (NOTE: See SECTION 3. for details on fit testing).

1.	The respirator straps must be worn in the correct place as shown in the manufacturer's instructions. Adjust the head bands until they are tight yet comfortable.
2.	To adjust the face piece properly, position the chin firmly in the chin cup and manually shift the face piece until the most comfortable position is located. Make the final adjustments on the headbands and do not break the nose seal.
3.	No beards or facial hair are allowed which interfere with the face fit. This may include long sideburns, beards and other conditions which would prevent a good seal; also temple pieces on glasses or a skull cap that projects under the face piece.
4.	A positive and negative pressure test needs to be performed every time a respirator is worn. The <i>negative pressure test</i> is performed on a half or full face piece respirator designed for filters or chemical cartridges. The test consists of covering the air inlet lightly and inhaling slightly. If a leak exists, the air can be felt as it enters. The common leak areas are around the nose and chin. The <i>positive pressure test</i> is performed by blocking the exhalation valve and exhaling lightly. Again, air leakage can be felt if a leak is evident. If such leaks are found, the respirator is to be adjusted and retested.
5.	For the initial fitting of a respirator, a more elaborate test will be conducted on each new employee or each time a new type of respirator is used. The banana oil odor test is primarily uses. A knowledgeable person will conduct the fit testing and may decide at times to use the irritant smoke test.
<input type="checkbox"/>	Banana oil (isoamyl acetate) test which can be used to check the respirator fit when using organic vapor cartridges by determining if the wearer can detect the odor of bananas.
<input type="checkbox"/>	Irritant smoke test can be used with particulate filters by determining if the wearer can detect the irritation of the smoke.

If a fit cannot be achieved, then a different size or style face piece needs to be fitted.

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Maintenance of Respirators

Respirators are to be cleaned after each daily use with alcohol preps and placed dry in a clean container or plastic bag for storage. More thorough cleaning is needed for dirty respirators or those shared. This involves performing the following procedures:

1.	Remove the cartridges or filters from the face piece. The filters and cartridges must not be washed.
2.	Immerse the piece in a warm water solution of commercial disinfectant liquid. The respirator should be scrubbed gently with a cloth or soft brush. Make sure that all foreign material is removed from all the surfaces of the rubber exhalation valve and plastic exhalation valve seats and face seal. NOTE: The inhalation, exhalation valves, valve cover, and cartridges will be replaced during the quarterly cleaning.
3.	After washing and disinfecting the respirator, rinse in clean warm water and allow the respirator to dry before storing.
4.	After the respirator is dry, store it in a clean container. Respirators should not be stored where chemicals are used or stored. Respirators should not be hung from nails on the walls or in chemical storage areas. The respirators must be stored in a normal position which means that they should not be stretched or stored under objects which could cause the face-piece to become warped.

Any respirator malfunction shall be reported to the supervisor who can evaluate the problem and ensure that proper replacement parts or a new respirator is supplied to the employee.

Each person assigned a respirator shall be responsible to maintain the equipment and routinely inspect the respirator before and after use for worn or dirty parts. **WORN PARTS WILL BE REPLACED IMMEDIATELY.**

Respirators will be periodically evaluated by the supervisor or safety manager to assure that the equipment is in proper working order condition and kept clean.

Routine inspection shall include an evaluation of:

<input type="checkbox"/>	Regulatory and warning devices are functional
<input type="checkbox"/>	Tightness of the connections
<input type="checkbox"/>	Condition of the face piece
<input type="checkbox"/>	Condition of the headbands
<input type="checkbox"/>	Condition of the cartridges (for respirators using cartridges)
<input type="checkbox"/>	Condition of the valves, and
<input type="checkbox"/>	Pliability and deterioration of the face piece material

A written record of the inspections will be kept by the supervisor. (see form Section 2. D).

Respirator Program Evaluation

It is important that both the respirator wearer as well as the supervisor and/or safety manager evaluate respirator use and program effectiveness. It is critical that the appropriate respirator be worn correctly.

If an employee notices any of the following they should immediately leave the area and replace the respirator if:

1.	Breathing becomes difficult.
2.	Dizziness or other distress occurs (see supervisor).
3.	Sense irritation, smell or taste contaminants.
4.	The respirator becomes damaged.

The overall program will be evaluated by the safety manager. This includes:

1.	Frequent unscheduled observation of employee respirator usage during job operations requiring protection to confirm proper respirator use.
2.	Observation and discussion of the respirator program with new employees and those who are not following proper protocols.
3.	Periodic discussions of respiratory use procedures during safety and management meetings.

The safety manager will use the program checklist at least annually to determine the overall effectiveness of the program and needed updates. If deficiencies are found then additional employee training will be given and more frequency evaluations will be made.

Medical Evaluations to Determine Suitability for Respirator Use

Purpose Medical certification of an employee is required for respirator use by OSHA rules 1910.1018 (h)(3) (iv) which state that if an employee has demonstrated difficulty in breathing during the fitting test or during use of respirators, he or she shall be examined by a physician trained in pulmonary medicine to determine whether the employee can wear a respirator while performing the required duty. The purpose of a medical evaluation is twofold:

1.	To determine if an individual is medically fit to wear a respirator, provided appropriate health and safety precautions have been taken in the work environment.
2.	To determine if an individual needs work restrictions, given the job that he or she is required to do.

NOTE: Job descriptions or job capacity evaluations need to be available to the physician doing the evaluation.

Oregon OSHA rules 1910.134(e)(1) state that "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." In addition, some specific OSHA standards for chemical substances or occupations may also contain requirements for medical examinations. Both standards require that a physician should determine what health and physical conditions are pertinent, and that the respirator wearers' medical status should be reviewed periodically.

In addition, some specific OSHA standards for chemical substances or occupations may also contain requirements for medical examinations. Both types of standards require that a physician should determine what health and physical conditions are pertinent, and that the respirator wearers' medical status could be reviewed periodically.

Oregon OSHA applies this standard when the air contaminates level or conditions could result in overexposure to the permissible exposure limit. Thus if filtering face pieces (dust masks) are provided for comfort mandatory medical screening would not be required.

Pre-placement medical examinations should screen out those who are physically or psychologically unfit to wear respirators. As another part of this examination, medical tests pertinent to the respiratory hazards that workers may encounter should be made to get baseline data against which to assess physiological changes in respirator wearers.

The medical fitness program requires having employees medically evaluated to ensure they are able to safely wear respiratory equipment. The medical fitness evaluation process involves:

Step #1	Notification to the supervisor that an employee needs to wear a respirator. (Form A - Respirator Assignment and Fit Testing Form).
Step #2	Health care provider gives the health questionnaire and arranges for employee assessment.
Step #3	Supervisor and/or safety manager is notified by the health care provider whether or not the employee can wear a respirator.

<input type="checkbox"/>	If pass, then supervisor or safety manager fits the employee in the appropriate respirator. The Selection and Fit form is completed and the employee receives a copy of the form which includes use and maintenance instructions.
<input type="checkbox"/>	If fail, the employee's letter will have specific instructions for further medical evaluation.
<input type="checkbox"/>	Additional evaluations and/or testing will be scheduled.
<input type="checkbox"/>	Upon completion of additional evaluations and/or testing, Health care provider will notify the Department and employee of a pass status.
<input type="checkbox"/>	If testing indicates additional medical intervention, Health care provider will contact the Department Head and Human Resources Department.

Medical Protocols

Currently, basic standards are available to determine fitness for respirator use. It is the responsibility of the evaluating physician to remain updated on changes in the ANSI and NIOSH guidelines. The ANSI and NIOSH guidelines also address the frequency of medical fitness determinations. (See Section 5 References: for NIOSH recommended medical protocols.)

The decision to certify an employee for respirator use depends on many factors; IE: the individual's medical history, physical examination, and test results (lung function tests, EKG, stress tests). Thus the following recommended medical examinations and tests are guidelines for the evaluating physician.

It is recognized that different types of respirators create different levels of demands on wearers. For example, wearing a half mask may be less demanding on a worker's physical capacity than a self-contained breathing apparatus (SCBA). For this reason, and depending on the employee's job duties, the examining physician may decide on further medical evaluation based on the medical questionnaire and physical evaluation that are part of this standard protocol.

It is important to note that the current Oregon OSHA respirator regulations on medical examinations leave the actual decision as to the type and detail of the examination up to the evaluating physician. The ANSI standard and NIOSH decision logic only provide recommendations. The final decision needs to be made by the evaluating physician.

Additional medical tests may be needed depending upon the medical findings. These test could include: chest X-ray, an EKG or a stress test.

Medical

Medical testing frequency is not addressed in the current OSHA respiratory Testing protection rules; however, NIOSH provides the following recommendation. This Frequency is an area that the evaluating physician will also need to be consulted. The

following is the NIOSH suggested frequency of medical fitness determinations for respirator users.

RECOMMENDED MEDICAL FITNESS TESTING FREQUENCY

WORKER AGE (years)	<35	34-45	>45
Most work conditions requiring a respirator	Every 5 years	Every 2 years	Every 1-2 years
Strenuous work conditions with SCBA	Every 3 yrs	Every 18 months	Annually

NOTE: Interim testing would be needed if changes in health status occur.

Reporting Several factors are involved to ensure that adequate reporting and record keeping is done. Confidentiality of medical results is most important. For this reason, the Medical Evaluation Report Form Section 2. C. has been devised that could be used by the evaluating physician to report the decision back to the employer. It should not list any medical diagnoses or conditions.

The employee should receive notification from the evaluating physician as to the results of the tests.

Retention It should also be stressed, that the preservation of medical records is according Medical to OSHA 1910.1020 (d) Preservation of Records (General Safety and Health Provisions). This requires that the records be retained for 30 years plus employment duration. The medical records may be kept by the evaluating physician or in a confidential file in their Personnel File if the employees agree to the transfer of their records.

If an employee works for one year or less, the County may give the employee their records and not retain them. If they are not given to the employee, then the 30 years retention time is in effect per the OSHA requirements.

APPENDIX 1

RESPIRATORY CARTRIDGE / FILTER SELECTION EXPLANATION

The following tables indicate potential chemical exposures in relationship to respiratory selection for various operations. The selection for emergency use will always be Self-contained Breathing Apparatus (SCBA) Respirators unless the Incident Commander gives other directions based on an assessment of the emergency release or spill.

The respirator selection charts are based on the County’s data as to what potential chemical exposures can occur and level of the employee exposures, OSHA, NIOSH, and manufacturer’s requirements.

The color code system used for respirator cartridges and canisters is based on ANSI K13.1973 Identification of Air Purifying Respirator Canisters & Cartridges.

COLOR CODE FOR CARTRIDGE/S/CANISTERS

Contaminant	Color Assigned
Acid Gas	White
Organic Vapors	Black
Ammonia Gas	Green
Acid Gas and Organic Vapor	Yellow
Radioactive or Highly Toxic Particulates/Fumes HEPA filter	Purple (Magenta)
Dust, Fumes & Mists	Red or gray with a red stripe
Other Vapors & Gases not listed	Brown

NOTES:

- A purple stripe shall be used to identify radioactive materials in combination with any vapor or gas cartridge.
- An orange stripe shall be used to identify dusts, fumes, and mist in combination with any vapor or as cartridge.
- Where labels only are colored to conform with this table, the canister or cartridge body shall be gray or a metal canister or cartridge body be left in its natural metallic color.
- The user shall refer to the wording of the label to determine the type and degree of protection the canister or cartridge will afford.

TYPE OF RESPIRATORY/ SYSTEM	NIOSH APPROVAL #
Supplied Air: SCBA	TC-13F
Supplied Air Respirator: <input type="checkbox"/> Air Line <input type="checkbox"/> Abrasive Blasting Unit	TC-19C TC-19CE
Gas Masks	TC-14G
Powered Air Purifying Respirators (PAPRs) Note: the specific cartridges and filters would have separate approval	TC-14G

Particulate Respirators: includes: HEPA, dust/mist, and dust/mist/fume	TC-21
Chemical Cartridges	TC-23C
<input type="checkbox"/> Ammonia use <input type="checkbox"/> 300 ppm	
<input type="checkbox"/> Chlorine use <input type="checkbox"/> 10 ppm	
<input type="checkbox"/> Hydrogen Chloride use <input type="checkbox"/> 50 ppm	
<input type="checkbox"/> Combination Cl ₂ , HCL & sulfur dioxide for use same as above and SO ₂ <input type="checkbox"/> 50 ppm	
<input type="checkbox"/> Organic Vapor use in general it is <input type="checkbox"/> 1000 ppm based on protection factor of 10	
<input type="checkbox"/> Paints with organic vapor & over filter <input type="checkbox"/> 1000 ppm	

Note other approved cartridges include:

- Chlorine dioxide
- Formaldehyde
- Hydrogen fluoride
- Hydrogen Sulfide
- Mercury
- Pesticide

It is important to note that the listed respirators are not for emergency or high exposure situations. Air-purifying respirators are not to be used in conditions which are immediately dangerous to life or health (IDLH).

Questions about the appropriate respirator should be directed to the supervisor and/or safety manager.

APPENDIX 2

COMPRESSED AIR QUALITY FOR SUPPLIED AIR SYSTEMS

High quality breathing air (not oxygen) is required when supplied air respirators or SCBA's are used. The Oregon OSHA codes (Oregon Administrative Rules Chapter 437, Division 2) require that at least Grade D quality breathing air be supplied. The specifications for Grade D breathing air are found in Compressed Gas Association Commodity Specification G-7.1-1989.

Cylinders of breathing air or compressors may be used. If compressors are used, it is preferable to use a carbon-vane pump designed especially for supplied air respirator use. Such pumps are electric or air-driven, oil-free, and are equipped with inlet and outlet filters. They do not produce carbon monoxide, oil vapor, or oil mist, as other compressors may.

If oil lubricated compressors are used, high temperature alarms, CO monitors and special airline filters are required.

Fittings and couplings for air lines must be incompatible with outlets for other gas systems to prevent inadvertent servicing of airlines with irrespirable gases or oxygen.

It is crucial that air compressors or pumps be placed in locations where the air is clean and breathable at all times. Compressors and pumps DO NOT remove carbon monoxide, toxic chemicals, or other air contaminants (other than large-size particulates which are filtered out at the inlet filter. Inlet and outlet filters, as well as other special filters with which some systems may be equipped, must be replaced periodically.

APPENDIX 3

ADDITIONAL SELECTION CRITERIA - ASSIGNED PROTECTION FACTORS

type of respirator used by NIOSH and the maximum concentration the specific type of respirator can be used for is determined by:

- Upper limit of exposure for type of respirator = Protection Factor x Employees airborne concentration

EXAMPLE:

- Employee's wood dust exposure level was 10 mg/m³ and the OR-OSHA permissible exposure limit (PEL) is 5 mg/m³ - what is the upper limit of exposure that a disposable respirator can handle?

$$- 5 \text{ mg/m}^3 \times 5 \text{ (protection factor)} = 25 \text{ mg/m}^3$$

The issue as to what level of protection from a contaminate can be achieved by a particular type of respirator has been established by general guidelines established by NIOSH (National Institute of Occupational Safety and Health). County employees are required to use respirators with the appropriate protection factors. Protection factor is a numerical number based on the ability of a respirator to maintain exposure levels below the permissible exposure limits.

The following is the overall guideline for the commonly used respirators by Douglas County employees. The protection factor number is set by the

- Employee's exposed to toluene during painting at 150 parts per million (ppm) the PEL is 100 ppm - what is the upper limit of exposure that a half-mask with organic vapor cartridge can handle?

- 100 ppm x 10 (protection factor) = 1,000 ppm

When there are questions about the exposure levels please contact the safety manager.

Assigned factors are in the following table:

ASSIGNED PROTECTION FACTOR	TYPE OF RESPIRATOR
5	Single use - disposable mask or quarter face piece mask.
10	Any air-purifying half-mask respiratory including the new half-piece disposable equipped with any type of particulate or chemical cartridges (note some chemical cartridge may have approval for less than 10 times the permissible exposure limit)
25	Any powered air-purifying respirator (PAPR) equipped with a hood or helmet and any type of particulate filter. Any supplied-air respiratory equipped with a hood or helmet operated in a continuous flow mode.
50	Any air-purifying full face piece respirator equipped with HEPA filters. Any PAPR equipped with tight-fitting face piece and HEPA filters. Any supplied-air respirator equipped with a tight-fitting face piece and operated in a continuous flow mode.
1,000	Any supplied-air respirator equipped with a half-mask and operated in a pressure demand or other positive pressure modes.
10,000	Any supplied-air full face piece respirator in pressure demand used in combinations with an auxiliary self-contained breathing apparatus operated in a pressure demand or other positive pressure mode cylinder of at least 5 minutes for escape. Any self-contained respirator equipped with full face piece and operated in a pressure demand or the other positive pressure mode.

SECTION 2. RESPIRATORY PROTECTION FORMS

The following forms are used to maintain records on our selection, fitting, medical evaluation and program surveillance.

Form A -	Respirator Assignment and Fit Record
	First part of the form is filled out by the assigning supervisor
	Second part of the form is completed by the person conducting the fit testing and training which may be supervisor, safety manager or knowledgeable person.
Form B -	Respirator Medical Evaluation Report This report is generated by the outside medical provider as to the fitness of the employee for wearing a respirator.
Form C -	Respiratory Protection Program Audit Checklist
	This checklist will be used by safety staff in evaluating the on-going respiratory protection program.

FORM A

Respirator Assignment And Fit Test Record

Employee Supervisor Completes the Following Information

Employee Name _____
Department in which respirator is used _____
Operation for which respirator is used _____
Chemical Exposure _____
How often and what duration of time is respirator use needed ? _____
Representative employee exposure results _____
SCHEDULED FOR MEDICAL RESPIRATORY FITNESS EXAMINATION _____
DATE _____

RESPIRATOR ASSIGNMENT & FIT RECORD

Date of FITNESS EXAM _____ Date respirator issued: _____
 Type & Size of respirator issued _____
 Respirator cartridges supplied _____

FIT TESTING

Date: _____
 Positive/ Negative Fit Test: _____
 Isoamyl Acetate Vapor Test: _____

USER INSTRUCTIONS

Donning and Doffing Methods
 Cleaning
 Maintenance

Problems with the respirator which require immediately leaving the area and replacing respirator or seek assistance from YOUR SUPERVISOR or REGION SAFETY OFFICER:

- Breathing becomes difficult
- Dizziness or other distress
- Sense irritation, smell or taste contaminants

1. The employee understands that a respirator must fit properly in order to be effective. I have had my respirator tested for face-to face seal. I have worn a respirator in normal air to familiarize myself with it, and have then worn it in a testing atmosphere.

2. I have received written & demonstrated practice instructions on wearing a respirator. I know how to adjust it & determine if it is fitting properly. I am aware that I am in violation of safety code if wear the respirator with a beard, sideburns or skull cap. I also understand that proper seal cannot be made over the temples of eye glasses.

3. I understand that I am responsible for the daily cleaning (or after each use) and proper storage of the respirator.

Employee Signature _____ Date _____

Supervisor Signature _____ Date _____

FORM B

Medical Evaluation Report

RESPIRATOR MEDICAL EVALUATION REPORT

Physician (or other) Licensed Health Care Professional

Respirator Recommendation

Employer Name: _____

_____ The employee is **able to use a respirator** according to the supplemental information provided by employer.

_____ The employees' medical condition **requires the following limitations** regarding use of a respirator.

_____ The employee is **unable to use a respirator** until further medical evaluations are performed.

Physician: _____ Facility: _____

Appointment Date: _____ Time: _____

- "Authorization to Disclose Medical Records" (attached to employee's copy)

_____ The employee has been provided with a copy of the PLHCP Respirator Recommendations.

PLHCP Signature: _____

Date: _____

- mailed to employer mailed to employee Occuhealth copy

Completed by: _____ Date: _____

FORM C

Respiratory Program Evaluation Checklist

RESPIRATORY PROTECTION PROGRAM CHECKLIST

A. PROGRAM ADMINISTRATION

- 1. Is there a written policy which assigns program responsibility, accountability, and authority?
- 2. Is overall program responsibility given to one person who is knowledgeable and can coordinate all aspects of the program?
- 3. Can feasible engineering controls or work practices eliminate the need for respirators?
- 4. Are there written procedures/statements covering the various aspects of the respirator program, including:
 - designation of authority and responsibility;
 - respirator selection;
 - purchase of approved equipment;
 - medical aspects of respirator usage;
 - issuance of equipment;
 - fitting;
 - training;
 - maintenance, storage, and repair;
 - inspection;
 - use under special conditions;
 - when and where respirators are required?

B. PROGRAM OPERATION

- 1. Respiratory protective equipment selection
 - Have work area conditions and worker exposures been properly evaluated?
 - Are respirators selected on the basis of hazards to which the workers are exposed?
 - Are selections made by persons knowledgeable of proper selection procedures?
 - Are only NIOSH approved respirators purchased and used?
 - Do the respirators provide adequate protection for the specific hazard in the concentration found?
 - Has a medical evaluation of the prospective user been made to determine physical and psychological fitness to wear the selected respirator?
 - Where practical, have respirators been issued to single users?
- 2. Respiratory protective equipment fitting
 - Are the users given the opportunity to try on several respirators to determine the one with the best fit?
 - Is the fit tested before the wearer begins using the respirator in the work area, both on initial assignment, and on a daily basis (positive and negative pressure tests)?
 - Are users who wear glassed properly fitted?
 - Is the face piece-to-face seal tested using one of the methods described earlier?
 - Are workers prohibited from entering contaminated work areas when they have facial hair or other characteristics which prohibit the use of tight-fitting face pieces?
- 3. Respirator use in the work area
 - Are respirators being worn correctly?
 - Are workers keeping respirators on all the time while in the work area?
- 4. Maintenance of respiratory protective equipment
 - Are respirators cleaned and sanitized after each use (when different people use the same device) or as frequently as necessary (for devices issued to individual users)?
 - Are respirators stored so as to protect them from dust, sunlight, heat, and chemicals?
 - Is storage in lockers, tool boxes, or work areas permitted only if the respirator is in a carton, carrying case, or closed container?
 - Are respirators inspected before and after each use, and after cleanup?
 - Are individuals instructed in inspection methods?
 - Are cartridges and filters changed on a regular basis?
 - Are respirators designated as "Emergency Use" inspected at least monthly (in addition to after each use), and is a record kept of such inspections?
 - Are replacement parts of the same brand as the respirator?
 - Are repairs made by manufacturers or manufacturer-trained persons?
- 5. Special use conditions (if applicable)
 - Is there a procedure for respirator use in atmospheres immediately dangerous to life and health?
 - Is there a procedure for confined space entry?
- 6. Training
 - Are users trained in proper respirator use, cleaning, and inspection?
 - Are employees trained in the health effects of the respiratory hazard present?
 - Are users evaluated, using competency-based evaluation, before and after training?

SECTION 3. Respirator Fit Testing

Respirator fit is extremely important. Respirator fit testing is used to test how well the tight fitting respirator face piece seals against the face. If there is not a good face-to-face piece seal, the contaminants may pass around the face piece and be breathed into the lungs. The results of the fit test are to be recorded on Form A - Respirator Selection and Fit Record. Respirator fit testing must be conducted annually.

Respirator fit testing may be done using two basic methods: qualitative or quantitative fit testing. Most employers use qualitative methods since quantitative procedures may be expensive and require complicated equipment. Currently only certain rules required quantitative fit test which include lead and asbestos regulations once exposure levels reach a certain exposure level.

Quantitative fit testing uses sophisticated equipment to measure the amount, if any of test material that leaks into the face piece of the respirator. County operations do not have exposures of the type of contaminants that requires quantitative fit testing.

Qualitative fit testing must be done upon initial assignment of a respirator and annually there after. Once the employee passes a fit test using a proper respirator, they should perform a simple daily negative or positive pressure test to ensure that the respirator is properly worn.

Respirators that are mandatory are not to be worn if the wearer has facial hair (beards or stubble). Head coverings, scars, and missing dentures or teeth can also affect respirator fit. Glasses will interfere with fit when using a full face piece. Full face piece can be fitted with spectacle inserts.

No one is permitted to cut off respirator straps, leave the straps off or wear them too loosely.

Positive and Negative Pressure Tests

Each time a respirator is put on, and prior to the qualitative fit testing procedures, the wearer should conduct a positive and a negative pressure test to ensure that the respirator is seated correctly against the face.

The negative pressure test is performed on any respirator with a tight fitting face piece. For cartridge respirators, the test consists of covering the air inlet lightly and inhaling lightly, then holding the breath for a few seconds. For SCBA and supplied air respirators, block the end of the breathing tube so it will not allow air in. Inhale lightly and hold the breath for a few seconds. In either type, if a leak exists, the air can be felt as it enters. The common leak areas are around the nose and chin.

The positive pressure test is performed on respirators with tight fitting face pieces and both inhalation and exhalation valves. It is done by blocking the exhalation valve and exhaling lightly. Again, air leakage can be felt if a leak is evident.

If such leaks are found, the respirator should be adjusted and retested. If a fit cannot be achieved, then a different size or style face piece needs to be fitted.

A qualitative fit test must be done again once the initial positive or negative pressure tests are completed.



Negative



Positive

Qualitative Fit Testing:

The following methods may be used to determine if the respirator wearer can achieve a basic fit with the respirator style and size selected. Exposures to some air contaminants, such as lead, arsenic, and asbestos in certain concentrations require quantitative fit testing.

1. Banana Oil (isoamyl acetate) Test

This test is used for half or full face air purifying respirators. This type of test is not required for Type C (supplied air pressure demand) airline respirators and SCBA devices, since they are operated in a positive pressure mode.

Air purifying respirators must be equipped with organic vapor or pesticide cartridges for this test. The test chemical smells like ripe bananas. The test consists of administering the chemical and having the respirator wearer determine whether or not he/she can smell the odor of bananas.

The chemical can be purchased in test ampules from safety equipment supply stores. Each of the various brands has specific instructions which you should follow.

The basic approach is to have the respirator wearer:

- Put on their respirator.
- Conduct a positive or negative pressure test to see if the respirator is seated properly against the face.
- Open one of the ampules and pass it close to the sealing surface of the respirator.
 - Have the wearer move their head up, down and to the side and speak out loud to ensure that the fit is maintained during activity.
- If no odor is detected, then the respirator fits the individual.
- If an odor is detected, then the individual needs to be refitted in another size or style face piece until fit can be achieved.

The banana oil test has certain disadvantages. Some individuals cannot smell the banana oil, so employees should be tested after the fit test to ensure that they can indeed detect the odor. Also, if an individual smells higher concentrations of the banana oil, they can develop an odor fatigue and upon immediate retesting, and may not be able to detect the material.

2. Banana Oil Testing in an Enclosure

There are additional methods using the banana oil where you actually construct a test environment using a large, clear plastic bag and known concentrations of banana oil. This method was developed by Dupont.

3. Saccharin Mist Test Kit

This test, developed by the 3M Company, is used for disposable dust and mist respirators and for half or full face respirators. Respirators must be equipped with particulate cartridges for this test.

The test kit includes a saccharin solution that is poured into a nebulizer that generates a mist of saccharin that is sprayed around the respirator face seal. The wearer is asked to breathe through their mouth, and if they sense a sweet taste then the respirator does not fit properly. If they notice no taste then the respirator has an adequate fit.

Since this is a taste test, it is important that the test subjects do not eat any sweet foods or drink sweet beverages just before the test.

The specific protocols are given in the kit instructions but basically include:

- Put on the respirator and conduct a positive or negative pressure test to see if the respirator is seated.
- Spray the saccharin mist close to the sealing surface of the respirator.
 - Have the wearer move their head up and down and to the side, and speak out loud to ensure that the fit is maintained during activity.
- If no taste is detected, then the individual has an adequate fit.
- If a taste is detected, then the individual needs to be refitted in another size or style face piece until fit can be achieved.

4. Irritant Smoke Test

Smoke tubes (stannic oxychloride smoke tubes) used to test ventilation systems can also be used as an effective chemical to test a respirator wearer's fit. This test can be used for half or full face air purifying respirators.

Since the chemical used to produce the smoke is irritating to the eyes and mucous membranes, additional care has to be taken in conducting this type of fit test. Smoke tubes are available from safety equipment supply stores.

The respirators must be equipped with high efficiency (HEPA) cartridge filters before starting the test. The basic procedures are:

- Put on the respirator.
- Conduct a positive or negative pressure test to see if the respirator is seated.
 - Have the wearer close his or her eyes before administering the smoke.
- Open one of the smoke ampules and pass smoke about two feet from the subject. If no leak is detected, then move closer passing smoke around the sealing surface of the respirator. Avoid the eyes.
- Have the wearer move their head up, down and to the side and speak out loud to ensure that the fit is maintained during activity.
- If no irritation is detected, then the individual has an adequate fit.
- If an irritation is detected, then the individual needs to be refitted in another size or style face piece until fit can be achieved.

The smoke test can also be administered in an enclosure like the one described with the banana oil.

SECTION 4. Training Respirator Wearers

The respiratory protection regulations require that employees need to be informed about the type of hazards that they may be exposed to and the reason for the respiratory protection. Employees are to be instructed on:

1. The type of respiratory hazard present and its effect on the body,
2. How to wear the respirator,
3. How to check for proper fit,
4. How to clean, inspect and store the respirator,
5. How to determine when to change respirators or cartridges, and
6. Who to contact and what to do if they have breathing difficulties or problems with the respirator.

The training allows the respirator user the opportunity to handle the respirator and wear it in normal air before it is worn in the actual work setting. Demonstrations and hands-on practice with the respirators are essential for good training. This is done by the supervisor, safety manager and/or knowledgeable person during respirator fit testing.

Once a respirator is assigned, the employee is responsible to:

- Check the respirator fit after each time you put it on,
- Use the respirator as the instructions state,
- Report any possible malfunctions,
- Store in a dry, clean location,
- Use proper personal hygiene in relationship to all personal protective equipment,
- Regular hand and face washing,
- Sanitize and maintain their respirator.

THE FOLLOWING PAGES ARE INTENDED TO BE USED AS A TRAINING GUIDE
HANDOUT FOR EMPLOYEES.

EMPLOYEE RESPIRATORY PROTECTION TRAINING HANDOUT

The respiratory protection regulations require that employees must be informed about the type of hazards that they may be exposed to and the reason for the respiratory protection. Employees are to be instructed on:

1. The type of respiratory hazard present and its effect on the body,
2. How to wear the respirator,
3. How to check for proper fit,
4. How to clean, inspect and store the respirator,
5. How to determine when to change respirators or cartridges,
6. Who to contact and what to do if they have breathing difficulties or problems with the respirator.

The following program is advisory only. It does not necessarily list all approaches to respiratory protection or address all rule compliance issues. This information is not intended to be all inclusive of workplace safety/health issues. Other additional information may be necessary for compliance with safety and health regulations.

RESPIRATORY PROTECTION GUIDELINES

1. Introduction. Why would you need to wear a respirator?

Respiratory protection may be needed to control employee airborne exposures to various contaminants under certain conditions. In the work place the inhalation of chemicals as gases, vapors, dusts, fumes, liquid mists is generally the most important route of entry into a persons body.

Chemical Exposure through Inhalation

Inhalation is generally viewed as the primary route of acute occupational exposure. The alveolar tissue (minute air sacs) in the lungs is estimated to have about 70 sq. meters of surface area. This tissue is extremely thin to allow for efficient gas exchange. This expansive and delicate tissue is the only barrier between inhaled toxic vapors and

gases and the circulatory system. It is obvious that with this vast exposure area, significant and sometimes fatal toxic concentrations can quickly enter the body. Examples of these gases are chlorine.

Virtually any gas or vapor can enter the body through the respiratory system. Dusts and fumes may also be toxic to the respiratory system. Toxic dusts and fumes include: silica, welding fume.

Specific OSHA required respiratory protection includes:

1. Where exposures to airborne contaminants exceed legal limits, such as:
 - when engineering controls do not exist and are not feasible
 - when engineering controls are not efficient enough to control exposures
2. Where an intermediate protective method is needed until engineering controls can be installed and tested.
3. When non-routine or emergency situations exist and exposure levels may not be known, but could reach hazardous levels.
4. When chemical presents a hazard even though it may not be regulated by a permissible exposure limit.

Respirator Selection

Respirators are selected based on the type and degree of respiratory hazard. Different respirators are needed for different types and degrees of hazard. It is important to consider when selecting a respirator, the nature of the work process, the time period for which protection is needed, and the activity level of the workers.

Physical and functional characteristics of the respirator, and respirator protection factors should also be considered. Because exposures to contaminants will vary not only in terms of the physical state of the material (dust, vapor, liquid, gas) but also in the material's toxicity and the way the material is used, it is important to select the proper respirator.

Only respirators approved by the National Institute for Occupational Safety and Health (NIOSH) should be used. The NIOSH approval should be for the use intended. A NIOSH approval number will be noted on the respirator, cartridges, filters and other parts.

Respirators are of two main types:

- Air purifying** - Air purifying respirators use chemical or mechanical filter cartridges to clean the contaminated air before it is breathed in by the wearer.
- Air supplying** - Air supplying respirators provide the wearer with uncontaminated breathing air, by use of an air compressor, tank, or cylinder.

Within each major category, there are several types of devices, each of which is appropriate for different uses.

RESPIRATORY PROTECTION SELECTION TABLE EXPLANATION

The following table provides a chart showing potential chemical exposures in relationship to respiratory selection for various operations.

The color code system used for respirator cartridges and canisters is based on ANSI K13.1973 Identification of Air Purifying Respirator Canisters & Cartridges.

COLOR CODE FOR CARTRIDGE/S/CANISTERS

Contaminant	Color Assigned
Acid Gas	White
Organic Vapors	Black
Ammonia Gas	Green
Acid Gas & Organic Vapor	Yellow
Radioactive or Highly Toxic Particulate/Fumes HEPA filter	Purple (Magenta)
Dust, Fumes & Mists	Red or gray with a red stripe
Other Vapors & Gases not listed	Brown

How to Wear a Respirator

Employee procedures when donning a respirator -

Once a respirator is assigned the employee is responsible to:

- Check the respirator fit after each time you put it on,
- Use the respirator as the instructions state,
- Report any possible malfunctions,
- Store in a dry, clean location,
- Use proper personal hygiene in relationship to all personal protective equipment,
- Regular hand and face washing,
- Sanitizing and maintains the respirator.

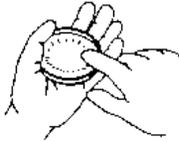
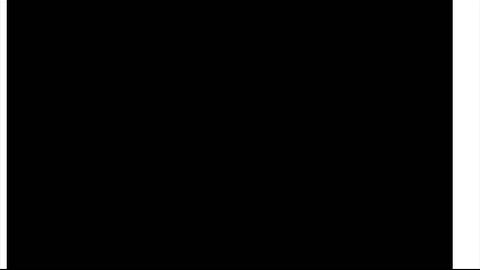
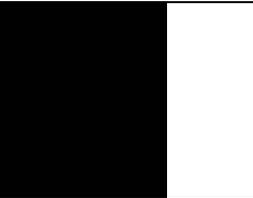
THE FOLLOWING ARE GENERAL INSTRUCTIONS FOR FITTING A HALF FACEPIECE RESPIRATOR.

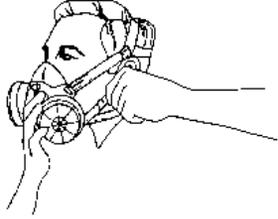
NOTE: Trainer is to review the specific procedures for each type of respirator being assigned to the employees. The manufacturer's instruction manual will be used.

FITTING INSTRUCTIONS

If the respirator does not fit you, it will offer no protection. You must check the fit of this respirator each time you use it, following these *Fitting Instructions*.

WARNING: This respirator should not be used by individuals with beards, or other facial hair which passes between the sealing flange of the respirator face piece and the wearer's face. Facial hair may cause leakage or interfere with the proper operation of the respirator exhalation valve, thereby exposing the wearer to the hazardous contaminants.

<p>HOW TO PUT THE RESPIRATOR TOGETHER</p> <p>1. Remove the face piece assembly and the air-purifying elements (filters, cartridges or filter/cartridge combinations) from the cartons. If the N7500-6 dust/mist, N7500-10 paint spray/mist or N7500-23 pesticide replaceable filters are being used, they should be assembled to the cartridges before the cartridges are attached to the face piece. Place the filters in the N7500-27 fit check/filter covers so that the entire outer edges of the filters are seated evenly and securely against the inner wall of the filter covers.</p>	
<p>2. Snap the fit check/filter covers with the filters seated evenly and securely, to the cartridges.</p>	
<p>3. Assemble respirator by screwing air-purifying elements onto the inhalation connectors mounted on the face piece. Check to be sure that each air-purifying element is tightly sealed against the face piece.</p>	
<p>4. After assembling the respirator and air-purifying elements, inspect the respirator to make certain the respirator has been damaged, the exhalation valve flap is in place, and the sealing flange is not distorted.</p> <p>CAUTION: Per OSHA requirements, a respirator must be inspected by the wearer before and after each use to insure that it is in good working condition.</p>	
<p>5. To put on the respirator, remove your protective eyewear (if worn), then grab the front of the respirator with one hand and the upper strap with the other hand. Then place the portion of face piece containing the exhalation valve under the chin.</p>	

<p>6. Position the narrow portion of the respirator on the nose bridge and place the cradle suspension system on the head and the bottom strip rests above the ears, on the back of the head . Then hook the bottom headband strap behind the neck, below the ears, and adjust the position of the face piece on the face for best fit and comfort.</p>	
<p>7. The lengths of the headband straps are adjustable; tighten or loosen by holding the respirator body of headband yoke with one hand and pulling on the elastic material in the appropriate direction with the other hand. (For a comfortable fit, the headband straps must be adjusted equally on both sides of the respirator.)</p>	

<p>8. Position the face piece so that the nose section rests as low on the bridge of the nose as is comfortable, and tighten the upper headband strap on both sides just tight enough so that the respirator doesn't slide down on the nose. Do not over tighten. (If the respirator pinches the nose, loosen the upper strap slightly.)</p>	
<p>9. Then, tighten the lower headband strap on both sides just tight enough to secure the respirator under the chin.</p> <p>(NOTE: For proper positioning and comfort, the upper headband strap must be adjusted first, then the lower straps must be adjusted.) If you previously removed your protective eyewear, put it back on at this time.</p>	
<p>10. Prior to entering the contaminated environment, check the fit of the respirator as follows:</p> <p>a. NEGATIVE PRESSURE FIT CHECK:</p> <p>To conduct this check, place the palms of the hands over the openings in the N7500-27 fit check/filter covers (if so equipped) or unscrew the air-purifying elements from the respirator and place the palms of the hands over the inhalation connectors, inhale and hold your breath for about 5 seconds. If the face piece collapses slightly and no air leaks between the face piece and the face are detected, a good fit has been obtained. If air leaks are detected, reposition the face piece on the face and/or readjust the tension of the elastic straps and repeat the negative pressure check until a tight seal is obtained. If the cartridges were removed, once a tight face piece-to-face seal is obtained, a co-worker or a representative of the Safety of Industrial Hygiene Department must assist the wearer by screwing the air-purifying elements onto the inhalation connectors mounted on the face piece. (This must be done without removing the face piece from the face.) Check to be sure that each air-purifying element is tightly sealed against the face piece.</p>	
<p>b. POSITIVE-PRESSURE FIT CHECK:</p>	

<p>This check is carried out by covering the opening in the exhalation valve guard with the palm of your hand, and simultaneously exhaling. If the face piece bulges slightly and no air leaks between the face piece and face are detected, a tight fit has been obtained. If air is detected to be leaking out between the face piece and the face, reposition the face piece on the face and/or readjust the tension of the elastic straps to eliminate the leakage. This check must be repeated until a tight seal of the face piece to the face is obtained.</p> <p>If you cannot obtain a good seal with your respirator, try a smaller size face piece, contact an Industrial Hygienist or North Safety Equipment Respiratory Protection Product Manager at 401-943-4400 for assistance prior to using this respirator.</p>	
<p>11. To “park” the respirator on your chest during a break: Unhook the bottom strap behind your head, and then slide the top strap down behind your neck, allowing the respirator to sit on your chest.</p> <p>12. To put the respirator back on: Put the upper (cradle) strap on first, and then hook the bottom strap behind your neck. If the respirator has been “parked” on the chest, make sure prior to putting the respirator on that the sealing flange and interior of the respirator are not dirty.</p> <p>WARNING: Do not remove or park the respirator while you are exposed to contaminated air.</p>	

TESTING FOR FIT

A respirator should not be assigned to a person unless the person is given a qualitative or quantitative respirator fitting test and the results of the test indicate the face piece of the respirator fits properly. Instructions for carrying out qualitative and quantitative respirator fitting tests are given in publications such as the ANSI Z88.2 American National Standard Practices for respiratory Protection and respirator manuals published by government agencies such as NIOSH, ERDA, and NRC. North Safety equipment has produced a respirator training film which illustrates qualitative and quantitative fit testing.

BEFORE ENTERING AN AREA CONTAINING A HAZARDOUS ATMOSPHERE, THE RESPIRATOR WEARER SHOULD TEST THE TIGHTNESS OF THE SEAL OF THE RESPIRATOR FACEPIECE TO THE FACE BY CARRYING OUT A POSITIVE PRESSURE FIT CHECK AND/OR A NEGATIVE PRESSURE FIT CHECK AND/OR A “BANANA OIL” (ISOAMYL ACETATE VAPOR) QUALITATIVE FIT TEST.

Respirator Storage and Maintenance

Respirators must be maintained to ensure effectiveness and to prevent chemical and bacterial contamination. Each respiratory wearer is assigned their own individual respirators.

Maintenance of Respirators

Respirators are to be cleaned after each daily use with alcohol preps and placed dry in a clean container or plastic bag for storage.

Respiratory face pieces which are individually assigned should be thoroughly cleaned periodically by the employee. This involves performing the following procedure:

1. Remove the cartridges or filters from the face piece. The filters and cartridges must not be washed. All cartridges will be replaced during the quarterly cleaning.
2. Immerse the respirator face piece in a warm water solution of commercial disinfectant liquid. The respirator should be scrubbed gently with a cloth or soft brush. Make sure that all foreign material is removed from all the surfaces of the rubber exhalation valve and plastic exhalation valve seats and face seat.

NOTE: The inhalation, exhalation valves, valve cover, and cartridges will be replaced during the quarterly cleaning.

3. After washing and disinfecting the respirator, rinse in clean warm water and allow the respirator to dry before storing.

4. After the respirator is dry, store it in a clean container. Respirators should not be stored where chemicals are used

or stored. Respirators should not be hung from nails on the walls or in chemical storage areas. The respirators must be stored in a normal position which means that they should not be stretched or stored under objects which could cause the face-piece to become warped.

Any respirator malfunction shall be reported to the supervisor and/or safety manager who can evaluate the problem and ensure that proper replacement parts or a new respirator is supplied to the employee.

Each person assigned a respirator shall be responsible to maintain the equipment and routinely inspect the respirator before and after use for worn or dirty parts. **WORN PARTS WILL BE REPLACED IMMEDIATELY.**

The routinely used respirators will be periodically inspected by the supervisor or safety manager in accordance with the program evaluation protocols listed in the next section.

Cartridge and Filter Use Time - Replacement Schedule

1. Mechanical - Filter Respirators

These respirators provided protection against particulate matter such as dust, mist and fumes. Usually a fibrous material is used to trap the particulates, and its efficiency is dependent upon the size of the particle relative to the filter size, particle velocity and, to some extent, the composition and shape of both the particle and fiber.

No filter is 100% efficient in removing particles, however there are high efficiency particulate air filters (HEPA) that are 99.97% effective. These filters are designed to protect against particles down to 0.3 microns and with a Permissible Exposure Limit of 0.5 mg/m³ or less.

Dust, mist and fume filters are designed to 99.5% effective for particles down to 0.6 microns. Dust and mist filters are 99.0% effective.

Filters must be replaced if the filter medium is damaged or if the filter is difficult to breathe through. Damage to the respirator or filter is usually evident and thus the wearer is able to easily determine that the respirator or filter must be replaced.

There is no accurate method of predetermining the service-life of the particulate respirator. The concentration of airborne dust is the major factor influencing the service life.

The more dust in the air the more dust the filter must be able to retain, and the faster the filter will clog. The breathing rate of the wearer will also influence the service-life. If a worker is doing light work, their breathing rate is approximately 20 lifters per minute. If the workload is heavy, the breathing rate may be 60 liters per minute or higher. This result in about three times the volume of air going through the filter and thus three times as much dust to be filtered and retained in the filter.

In summary the major limitations include:

- Mechanical filters do not provided oxygen, so they must not be used in oxygen- deficient atmosphere.
- They provide no protection against gases or vapors.
- There is a pressure drop through the filter medium; therefore, there is some breathing resistance. As the filter loads up this resistance increases; thus people with respiratory problems should ensure that they are capable of wearing this type of respirator.

2. Chemical Cartridge Respirators

These respirators are vapor and gas-removing, using a cartridge attached to the face piece containing chemicals to trap or react with specific vapors or gases, and remove them from the air breathed.

The filtering medium is commonly activated carbon which primarily removes organic vapors. Activated carbon can also be impregnated with other substances to make it more selective against specific gases and vapors.

There are a number of factors which influence the service-life of a chemical cartridge respirator. They include:

- Breathing rate
- Humidity
- Contaminant concentration
- Temperature
- Duration of exposure

All these factors make it very difficult to give a general statement as to how long a specific gas/vapor respirator will last.

In order to be NIOSH approved a gas/vapor respirator must pass a number of service-life tests. One of the test requirements is a minimum service-life which is determined when the permitted penetration value is detected.

Since there is no easy method to determine service-life the best policy is to replace the respirator or cartridge when:

- An odor or taste is detected, or symptom occurs
- It becomes hard to breath through
- The cartridge or respirator is damaged

There are number of limitations to the use of chemical cartridge respirators which are important. These include:

- They do not supply oxygen and thus cannot be work in oxygen-deficient atmospheres.
- These respirators are designed for protection against specific gases or vapors. Thus users must take care that the proper cartridge is selected.
- These cartridges can only be used for protection against contaminants with good warning properties (smell, taste, irritation). The respirator works at 100% efficiency until the capacity of the sorbent is reached, then the contaminant passes through the sorbent material and is inhaled by the wearer. Thus there must be a warning system that alerts the wearer that the chemical cartridge is used up.
- The cartridges are not approved for high concentrations of the contaminants.
- The respirator must be protected from the atmosphere while in storage because they tend to pick up water vapor from the air and reduces the service life.

MEDICAL CONSIDERATIONS FOR RESPIRATOR WEARERS

Oregon OSHA rules 1910-134(b)(10) state that no one should be assigned a task requiring use of respirators unless found physically able to do the work while wearing the respirator. In addition, some specific OSHA standards for chemical substances or occupations may also contain requirements for medical examinations. Both types of standards require that a physician should determine what health and physical conditions are pertinent, and that the respirator wearers' medical status should be reviewed periodically if specified by the PLHCP.

Oregon OSHA applies this standard when the air contaminate level or conditions could result in overexposure to the permissible exposure limit. Thus if respirators are provided for comfort and additional protection mandatory medical screening would not be required.

Pre-placement medical examinations should screen out those who are physically or psychologically unfit to wear respirators. As another part of this examination, medical tests pertinent to the respiratory hazards that workers may encounter should be made to get baseline data against which to assess physiological changes in respirator wearers.

The Douglas County medical fitness program involves our medical services administering a health questionnaire and an evaluation and medical testing by health care providers at locations convenient to our employees. The protocols are given on the following pages.

The medical fitness evaluation process involves:

Step 1 Notification for the supervisor that an employee needs to wear a respirator.(Form A Respirator Selection and Fit Testing Form).

Step 2 Safety Manager gives the health questionnaire and arranges for medical evaluation.

Step 3 The employee's supervisor and/or Safety Manager is notified as to whether or not the employee can wear a respirator.

& Fit If yes, then the Safety Manager fits the employee in the appropriate respirator. The Selection Form is completed and the employee receives a copy of the form which includes use and maintenance instructions.

supervisor If no, then it is determine what type of work restrictions were given and works with the supervisor concerning the work assignments.

Evaluation of the Program's Effectiveness

Respirator Program Evaluation

It is important that both the respirator wearer as well as the supervisor evaluate respirator use and program effectiveness. It is critical that the appropriate respirator be worn correctly.

If an employee notices any of the following they should immediately leave the area and replace the respirator if:

1. Breathing becomes difficult,
2. Dizziness or other distress occurs (see supervisor),
3. You sense irritation, smell or taste contaminants,
4. The respirator becomes damaged.

The overall program will be evaluated by the safety manager. This will involve:

1. Frequent unscheduled observation of employee respirator usage during job operations requiring protection to confirm proper respirator use.
2. Observation and discussion of the respirator program with new employees and those who are not following proper protocols.
3. Periodic discussions of respiratory use procedures during safety and management meetings.

Self-Contained Breathing Apparatus (SCBA)

County employees are not normally assigned SCBA therefore, the following information may only apply in very limited manner but is provided based on potential for emergency response use or in case of confined space entry rescue responsibilities.

SCBA and Air Quality

Respirators which supply air where the user carries a supply of respirable air is called a SCBA unit. The air quality must meet Grade D standards of the Compressed Gas Association Specification 67.1. This means that the carbon monoxide level must not exceed 20 ppm, carbon dioxide not to exceed 1000 ppm and the condensed hydrocarbons must not exceed 5 mg/m³. Note: it is prohibited to use oxygen in place of air.

Positive Pressure-Demand SCBA

SCBAs with positive pressure-demand regulators are designed to permit entry into an immediately dangerous to life situation. The units are the primary respiratory protection of fire fighters and hazardous material responders.

A cylinder of high pressure (2000-4500 psi) compressed air supplies air to a regulator that reduces the pressure for delivery to the face piece. This regulator also serves as a flow regulator by passing air to the face piece on demand. The regulator is either mounted directly to the face piece or a flexible corrugated hose connects the regulator to the respiratory inlet covering, usually a full-face piece.

The regulator provides pressure to the face piece at all times and then additional air based on wearer demand. Because of the positive pressure any leakage should be outward; therefore a pressure-demand SCBA provides good protection. The designed air flow rate is approximately 350 - 400 liters per minute.

Contrary to common belief, the pressure-demand SCBA has the same service times as a demand version of the same device, if it seals well on the wearer's face. Any leakage increases air consumption and decreases service time.

Some open-circuit SCBA can be switched from demand to pressure-demand operation. The demand mode should be used only for donning and adjusting the apparatus in order to conserve air and should be switched to "pressure demand" for actual use.

Safety Features

Several required safety features are on all SCBA units certified for entry which provide additional protection include:

1. Pressure gauges visible to the wearer which indicates the quantity of gas of remaining in the cylinder.
2. Remaining service life indicators or warning devices that signal alarm when only 20-25% of service time or service volume remains.
3. Bypass valves, in case the first and second stage reducer or regulator fails and it is necessary to conserve or provide respirable air.
4. Fittings on devices that use compressed air which are incompatible with other compressed fittings.

Escape Only SCBA Units

SCBAs are also certified by NIOSH for escape from IDLH environment. These escape-only SCBA are generally of short duration, 3, 5, or 10 minutes, and are small in both size and weight. These compressed air cylinders are usually hip or back-mounted with air valve in a readily assessable position to have positive air pressure inside the respiratory inlet covering which is usually a hood.

NOTE: At least a 15-minute supply of air is required for entry into an IDLH environment for rescue of containment purposes.

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