

NORTH CAROLINA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
Respirator Policy and Program

1. Policy

It is the policy of the NCDA&CS that exposure to hazardous chemicals shall be controlled through engineered design when feasible. When adequate protection can be achieved only by the use of respiratory equipment, such equipment shall be properly selected, used and maintained.

Each site shall implement a respirator program which ensures that:

- A list of tasks for which respirators are required is developed, specifying the specific type of respirator to be used.
- Consultation is made with the Department Safety Director to ensure proper selection of respirators.
- Employees are annually trained in the proper use of respirators.
- Each employee undergoes a health evaluation before wearing a respirator.
- Fit testing is performed periodically.
- No impediment (e.g., facial hair) is permitted to interfere with proper respirator fit.

This policy is intended to insure respiratory protective equipment and procedures are uniform and effective for all NCDA&CS sites.

2. Scope

This policy applies to all NCDA&CS employees, sites, and except for sections 5.10 and 5.11, to non-NCDA personnel such as visitors, contract personnel and vendors if such individuals enter areas where the use of respirators is required.

If a NCDA site provides respiratory protective equipment to non-NCDA&CS personnel, such equipment shall be inspected before issuing to ensure it is in proper working order. These inspections shall be documented. Furthermore, when respiratory protective equipment is provided, NCDA&CS shall provide training in the proper use and fitting of respirators.

3. Responsibility

3.1 Employee Responsibility

Individual employees as well as supervisors are responsible for following all of the applicable requirements of this policy.

3.2 Administration

Each NCDA&CS site location where respirators are being used should assign the responsibility of overseeing the administration of the respirator program to an individual. The Safety Director will assist in Department-wide compliance by providing a written program, training on the proper use and maintenance of respirators and overall program administration.

4. Definitions

4.1

Immediately Dangerous to Life and Health (IDLH) Atmospheres - Oxygen deficient air quality which poses an immediate threat to life or health (less than 19.5% Oxygen), or conditions which pose an immediate threat to life and health by exposure to air contaminants, including radioactive materials that are likely to have adverse cumulative or delayed effects on health. Air supplied (SCBA or air line respirators with emergency air supply) respirators shall be permitted only under these conditions.

4.2

Inhalation hazard - includes exposure to oxygen deficient atmospheres as well as exposure to air contaminants in concentrations exceeding OSHA permissible exposure limits (PEL), threshold limit values (TLV), or industry designated control levels (DCL).

4.3

Site Manager - the person responsible for all employees at a particular site, building or work group. In smaller divisions, the division director may be responsible directly.

5. Minimum Requirements

Site managers (or their functional equivalents) are responsible for ensuring the following minimum requirements are met:

5.1 Use Requirements

Respirators must be used whenever an inhalation hazard exists. Sole reliance on respirators to protect employees from inhalation hazards shall be only under the following conditions:

5.1.1 Technical Feasibility

Respirators may be the sole means of protection when it is technically infeasible to eliminate an inhalation hazard by substitution of a less hazardous material; or by use of engineering, or work practice controls. Appropriate use may include, but not limited to emergency situations, operations such as construction, agricultural spraying, maintenance, repair, or decontamination. Whether or not it is appropriate to use respirators shall be determined on a case-by-case basis.

5.1.2 Economic Feasibility

Respirators may be used for employee protection when other controls have been demonstrated to be economically impractical. This determination shall be made on a case-by-case basis.

5.2.3 Implementation of other controls

Respirators may be relied on for employee protection during the time necessary to implement other controls.

5.2 Potential Inhalation Hazards

The use of respirators as a discretionary precaution may be required even though an inhalation hazard has not been conclusively demonstrated.

5.3 Respirator Requirement List

Each site shall prepare and maintain a list of all areas, jobs, or job tasks for which respirators are required. Such assessment may be included as part of a PPE hazard assessment.

5.4 Written Program

This text shall constitute the NCDA&CS respirator program. Site-specific standard operating procedures shall be added as Appendix "C" and shall include a description of job tasks requiring respirator use.

5.5 Respirator Selection and Issue

Selection of respiratory protective equipment to be worn in a given situation shall be determined by the site manager and consultation with the Department Safety Director. The following must be considered:

- a. the type and degree of inhalation hazard;
- b. the characteristics of the operation or process;
- c. the level of protection afforded by the respirator;
- d. the uses for which the respirator is approved.

Each employee required to wear a respirator shall be issued his/her own air-purifying respirator and be responsible for cleaning, storing and maintaining it.

5.6 Training

Site Managers shall ensure that each person required to wear a respirator is fully informed both of the inhalation hazards (i.e., why the respirator is required) and correct use of the relevant respiratory protective equipment. A formal training program shall be conducted annually by the Department Safety Director or his designee for respirator users and their supervisors. A permanent record must be kept of the type and contents of training and to whom training was given.

5.7 Respirator Fit

No one shall wear a respirator without first ensuring that it fits properly.

5.7.1 Fit Testing

A fit test using irritant smoke, or banana oil, or both shall be conducted when an individual is assigned a dual cartridge respirator and every year thereafter. Prior to each use, a respirator wearer will conduct a positive and negative pressure check in accordance with the supplier's instructions. Whenever qualitative fit testing is performed, the standard operating procedures in Appendix A shall be followed. Dust mask wearers require annual fit testing using a atomized saccharin solution.

5.7.2 Impediments

Respirators shall not be worn when there is a physical impediment to continuous contact between the sealing surface of the respirator and the wearer's face. Such impediments may be temple pieces on glasses, absence of dentures, a skull cap that projects under the face piece or other as specified in OSHA Standard 1910.234.

5.7.3 Facial Hair

Anyone required to wear a respirator shall not have visible facial hair (greater than 48 hour growth) if that hair:

- a. may interfere with the functioning of respirator valves;
- b. will come in contact with the sealing surface of a respirator that relies on a face-to-face piece seal for proper operation.

Note: Specific procedures must be followed when implementing this requirement. NCD&CS Personnel Division should be consulted.

5.8 Respirator Maintenance, Cleaning, Storage and Repair

Each employee issued a respirator shall be responsible for its maintenance, cleaning, storage and repair. Guidelines for the above are written in Appendix B. If parts are needed for the respirator to function as designed, their supervisor must be informed immediately. No employee shall be required to wear a respirator that is in disrepair. Routine inspections shall be conducted by the supervisors to ensure maintenance, cleaning and storage is being done properly.

5.9 Respirator Inspection

A functional and visual inspection of the respirator shall be made after each cleaning and before each use. This inspection shall occur before the respirator is worn and documented at least monthly on an inspection checklist.

5.10 Respirator Program Evaluation

The work area shall be inspected and evaluated periodically to determine the continued effectiveness of the respirator program by the site manager and safety director. Supervisors shall monitor the correct use of respirators by individuals under their supervision. The type and degree of potential inhalation hazard to the respirator wearer should be periodically determined through the use of air sampling measurements.

5.11 Health Evaluation

Employees required to wear respirators shall do so only after approval by a qualified physician according to the NCD&CS medical protocol for users of respiratory protection. If health conditions of an employee so warrant, a power air purifying respirator (PAPR) may be issued to that employee. The physician or health care professional shall determine if a PAPR is necessary on a case by case basis.

5.12 Acceptable Equipment

Only a respirator approved by NIOSH/MSHA for the intended application will be used. The safety director shall be consulted to determine which respirator should be used for a particular task.

5.13 Atmospheres Immediately Dangerous to Life and Health (IDLH)

No NCDA&CS employee shall be exposed to situations which are considered IDLH by the division director, manager, supervisor, or safety director.

5.14 OSHA Standard

This procedure/policy addresses the requirements of 1910.134. (Revised in 1998)

6. Audit

The safety director shall periodically audit policy/program implementation at all NCDA sites and in all NCDA divisions affected by this policy.

APPENDIX A

Respirator Training and Fit Testing Program

Standard Operating Procedure 1

Orientation Program

Purpose

The orientation program serves to solicit the involvement and cooperation of the test subject. Basic principles covering the proper donning of the respirator, the steps involved in conducting a fit test, and the need for cooperation are highlighted.

Contents

The orientation program will cover the following points:

1. Purpose of the fit test and the importance of fitting a respirator properly.
2. Importance of the test subjects cooperation.
3. Explanation of performing the qualitative fit test using a test atmosphere.
4. Description of the test atmosphere and how to identify it.
5. Importance of selecting a properly fitted respirator and how to make a selection from the array of respirators.
6. Instructions on proper donning and on positive and/or negative pressure checks.
7. Instructions on adjusting head straps or harness for comfort creating leakage where the respirator which is too loose or too tight, positioning the face piece on the face, stability of the face piece on the face, wearing of other personal protective equipment during fit testing, minimizing vision obstruction and movement restriction.
8. Determination of the test of its ability to detect a low concentration of the test medium.
9. Importance of the test exercises and how to perform them.

Respirator Fit Test Data Collection Form

Standard Operating Procedure No. 2

Employee Name

1. SS Number _____ Date _____ Last _____ First _____ MI _____ Age _____

2. Years Experience With Respirator _____ 3. Freq. of Use Per Month _____ 4. Mask Now Using _____ 5. Unusual Conditions _____

6. Qualitative Tests
 PP NP IA IS SAC

7. IAA Sensitivity Test - Pass Fail
 8. Smoke Sensitivity Test - Pass Fail
 9. Saccharin Sensitivity Test - Pass Fail

P = Passed
 F = Failed
 NR = Not Run

Test Instructor's Name _____ _____ Employee's Signature
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10. Respirator Selection

	Brand	Size	Type	Pass	Fail
a)	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____

11. Mask Selected _____

Key

Brand Names

1. MSA
2. AO
3. Willson
4. Surviv-Air
5. Pro-teck
6. Glenaire

Unusual Conditions

1. Beard/Heavy
2. Beard/Light
3. Scars
4. Wrinkles
5. Glasses
6. >24-Hr Beard Growth

Facial Conditions (x)

- Wrinkles
- Broken nose
- Deep Nostrils
- Small Face
- Narrow Face
- Wide Face
- Wide Bridge
- Shallow Bridge

Standard Operating Procedure No. 3

Selection of a Respirator for Comfort

Purpose

A respirator should be selected so they provide as comfortable a fit as possible. Studies have shown that a comfortable face piece usually provides the best fit. The importance of allowing the respirator user to evaluate the degree of comfort provided by several different models of respirators cannot be overemphasized. No single model of respirator will provide a universal fit. Several different face pieces and brands of respirators will be available for selection.

Procedure

The selection of respirators to be used at the work site should be made. The array can include not only different manufacturer's face pieces but also different face piece types - e.g., ½ or full face pieces as well as different sizes of each of the face piece types. Most manufacturers now have two or three sizes available for each face piece type. Respirators from two manufacturers will usually provide a sufficient variety to fit nearly 100% of NCD&CS employees. As many as five or six manufacturers may be used to assure maximum protection and comfort to their users.

The selection process must be conducted in a room separate from the fit test chamber to prevent odor fatigue. Prior to the selection process, the test subjects should be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to assess a "comfortable respirator". A mirror should be available to assist the subject in evaluating the fit and positioning of the respirator.

Assessment of comfort should include reviewing the following points with the test subject.

- Chin properly placed.
- Positioning of mask on nose.
- Strap tension fit across nose bridge.
- Room for safety glasses.
- Distance from nose to chin.
- Room to talk.
- Tendency to slip.
- Cheeks filled out.
- Self observation in mirror.
- Adequate time for assessment.

Respirator Selection

The selection should proceed as follows.

1. The respirators are spread out in front of the test subject. The subject should understand that he/she is being asked to select the respirator which provides the most comfortable fit. Each respirator represents a different size and shape and if fit properly, all are equal in the protection they will provide.
2. The test subject holds each face piece up to the face and eliminates those which are obviously not giving a comfortable fit. Normally selection will begin with a ½ face and if a fit cannot be found there, the subject will be asked to go to the full face respirators. (A small percentage of users will not be able to wear any ½ mask.)
3. The more comfortable face pieces are recorded, the most comfortable mask is donned and worn at least 10 minutes to assess comfort. Assistance in assessing comfort can be given by asking the questions listed above. If the subject is not familiar with using a respirator, he/she should be directed to don the mask several times and adjust the straps each time so that he/she becomes adept at setting proper tension on the straps.
4. Test subjects should conduct a negative and positive pressure fit test according to Standard Operating Procedures Nos. 9 and 10. Before conducting the negative or positive pressure test, the subject should be told to “seat” the mask by rapidly moving his head side to side and up-down taking few deep breaths.
5. The subject is now ready for fit testing.
6. After passing the fit test, the test subject should be questioned again regarding the comfort of the respirator; if it has become uncomfortable, another model of respirator should be tried.
7. Once a respirator is selected which is most comfortable to the user, he/she shall wear that respirator for a minimum of 10 minutes before proceeding with the actual qualitative fit test.

Standard Operating Procedure No. 4

Stannic Oxychloride Irritant Smoke Respirator Fit Test

This protocol describes a qualitative method for conducting respirator face piece fit test. It verifies the test subject's ability to detect a nominal concentration of the test agent and exposes him/her to a test atmosphere of adequate concentration. The protocol is based on offering a variety of respirator sizes and models so that each user can find a respirator that provides a good face seal without causing discomfort.

Program 1

1. Tests each subject's ability to detect the test agent;
2. Helps the test subject select a comfortable respirator;
3. Test respirator fit using a test atmosphere for adequate concentration.

If irritation or coughing is not detected and the fit remains comfortable, the respirator is considered to have an adequate face piece fit. Detection of irritation or coughing indicates an inadequate fit. If the subject fails the test, another respirator is selected for testing. Once the fit test has been passed, a minimum protection factor of 10 can be assumed. Use of negative pressure, half-face or full-face piece respirators are limited by law to concentrations less than 10 or 100 times the PEL, respectively.

Caution

The usual response of the normal healthy individual to stannic oxychloride is a harmless involuntary cough or the sensation of irritation. However, all test subjects may not be normal, healthy individuals. In some persons with certain respiratory ailments or dysfunctions induced coughing may create discomforts. Those individuals should be tested with other test atmospheres or may even have to be excluded from respirator use due to their inability to withstand the additional stress of wearing respiratory protective devices.

- A. Initial preparations would consist of the following:
 1. Review the entire contents of the protocol.
 2. To decide on respirator brands and models you use. Most manufacturers offer three sizes for each model. Order several of each size and model along with a supply of high efficiency filters. Don't forget to include full face pieces.
 3. Locate area suitable for conducting the fit tests. You will need two areas. One at least 12' x 20' while the other can be as small as 6' x 6'. Both rooms should be well ventilated but not connected to the same recirculating ventilation system. The smaller room will house the fit test chamber so preferably, this room should exhaust directly outside. A bathroom or a room with a lab hood works well. Weather permitting, the testing may be done outdoors. Assemble the test fit chamber (SOP 5).

- B. Final preparation for testing consists of the following:
 1. Hang the fit test chamber in the appropriate area (SOP 6). Test exercises and Rainbow Passage should be taped to the inside walls of the test chamber at eye level. Place the smoke tubes and aspirator bulb near the test chamber for easy access.
 2. In the area separated from the fit test chamber, set up three work tables.

- a. Place the smoke tube and respirator bulb on one table. Tape the test instructions to the top of the table.
- b. A second table can be used for the orientation program. The data collection forms can also be placed there. Each subject should fill out a form before he/she reviews the orientation program. Have the subjects keep their forms with them as they go through this test procedure.
- c. The last table should contain your selection of respirators. One end of this table, or a fourth table, can be used for respirator cleaning.

C. Fit testing should proceed like this:

1. The test subjects receive an orientation program and fill out the data form.
2. Taking the data form with them, they go to the irritation sensitivity test area, read the instructions and take the tests. Their response is recorded on the data form. If they fail the test see SOP 7.
3. Moving on to the respirator selection area, the instructor helps them to select the most comfortable fitting respirator (SOP 3). A functional fit test should be conducted (SEP 9, SOP 10). The respirator is worn for at least 10 minutes and unless it is uncomfortable, it is worn into the fit test chamber.
4. The test subject is asked to step inside the chamber.
5. Irritant smoke test atmosphere is administered to the test subject. If the irritation becomes noticeable inside the face piece or if coughing occurs, the test subject, without removing the respirator exits the test chamber. Upon exit from the chamber, the mask is removed and cleaned. Another respirator is chosen for testing.
6. The procedure is repeated until the fit test is passed. Remember to record all pertinent information on the data form.
7. In lieu of using the test chamber, the subject may be challenged with the irritant smoke by using a smoke tube and aspirator bulb. Gently squeeze the bulb and direct the smoke around the face seal with the employee wearing HEPA and acid gas cartridges. If no reaction is observed, proceed with the IAA fit test (SOP 7).
8. The test subject should be informed what respirator he/she had been assigned.
9. Fit testing should be performed at least biyearly, or sooner if anything should happen that may have affected respirator fit, i.e., sizeable weight loss and gain, dentures, facial scars, etc.

Standard Operating Procedure No. 5

Test Chamber Design

Purpose

A simple inexpensive chamber was designed to facilitate respirator fit testing. The components can be easily assembled.

Materials

1. In a clear polyethylene bag approximately 24 inches in diameter and 60 inches long (e.g., a 55 gallon drum liner).
2. A 24-inch diameter disc cut from 1/4" plywood or masonite with a 1/4" diameter hole at the center.
3. A 1/4" diameter eye bolt with nuts and washers.
4. A binder clip 2" thread screw hook.
5. A pulley and 50' cord.

Assembly

1. Screw one nut to the top of the eye bolt stem. Slide one washer up to the nut and insert assembly through the disc. Slide the second washer over the stem and tighten the second nut.
2. If using a binder clip, screw another nut approximately 1/2" up the eye bolt stem and slide another one washer up to the nut. Place one arm of the binder clip over the eye bolt stem up against washer, slide another washer against clip, and screw last nut onto high bolt stem. Tighten nuts so that bottom of eye bolt stem is flush with the bottom nut. If using a screw hook, place the screw hook into the disc as close to the center as possible on the side opposite the eye bolt.
3. Hold the polyethylene bag with the open end pointed down and slide the disc (with eye bolt pointed upward) up through the bag towards the closed end. The disc becomes the chamber ceiling.
4. Make a small hole in the top of the bag for the eye bolt to go through. Tie one end of a long (45') nylon cord to the eye bolt. Run the other end of cord over pulley wheel. Attach a shorter (5') cord through swivel eye on pulley assembly. A short cord can now be attached to ceiling thrust or to another sturdy appendage of sufficient height to allow chamber height adjustment for varying size subjects. The chamber should be adjusted so that the chamber ceiling is approximately 6" above the top of the test subject's head. The unit is now ready for use as a respirator fit test chamber for either isoamyl acetate or irritant smoke.

Standard Operating Procedure No. 6

Sensitivity Check

Purpose

For this qualitative test protocol to be effective, persons tested must be able to detect very low isoamyl acetate (IAA) concentrations. This ability can be evaluated through the following procedure.

Materials

Two medicine droppers or syringes with cc or ml markings. Isoamyl acetate also known as isopentyl acetate. Odor-free water (approximately 25° C) e.g., distilled or spring water.

Three 1 liter glass jars with metal lids (Mason or Ball jars), which are volumetrically graduated. Non-glass jars may absorb the IAA.

Procedure

The preparation of the IAA test jars should not take place in the room where the sensitivity check will be conducted. Only the 1.0 ppm and the blank jars should be taken to the sensitivity check area. Squirt 1 cc of full strength IAA into a 1 liter jar containing 800 cc odor-free water. Screw on the lid and shake the contents of this stock solution for ½ minute. This mixture is good as a stock solution for one week. Remove lid and with another dropper or syringe extract .5 cc of IAA stock solution and transfer it into a second 1 liter jar containing 500 cc odor-free water. Immediately screw on the lid and shake the contents for ½ minute. Allow the mixture to stand undisturbed for 2 or 3 minutes to allow the IAA concentration above the liquid to reach equilibrium. This test solution is good for a full day's use. Pour 500 cc water into a second and third 1 liter jar (blank). The second and third jars will serve as a control. Label each jar 1,2 and 3 to identify the jars. If the labels are put on the lids, you can periodically dry the lids off and switch them to avoid having the test subjects assume the same jar always has the IAA. Caution must be taken to assure that the blanks do not become contaminated with IAA.

Without indicating which jar contains the IAA, ask the subject to shake each bottle, then remove the lid and identify the jar having the odor of IAA. The following directions can be typed on a 5 x 7 inch index card to standardize this test.

“The purpose of this test is to determine if you can smell odors at a low concentration. The bottles in front of you contain water. One of these bottles also contains the small amount of banana oil or IAA. Be sure the covers are tight, then shake each bottle for 2 seconds, unscrew the lid of each bottle one at a time and sniff the mouth of the bottle. Identify to the instructor in which bottle you can detect an odor.”

If the test subject smells banana oil or IAA in the correct jar, proceed with the IAA Qualitative Fit Test. If no odor in the IAA jar is detected, prepare a stronger mixture by extracting 1 cc from the stock mixture and squirt into a jar containing 500 cc of water. Again prepare a blank. If subject detects isoamyl acetate in the correct jar, proceed with the IAA Qualitative Fit Test. The test subject should be told that this is the level of odor perception that he should be looking for inside the respirator when the fit test is being conducted. If no odor is detected, proceed with irritant smoke test. If the test subject cannot detect IAA, he should be re-examined to be certain that he can detect the odor of the contaminants he will be working with. The mixtures used in the IAA-odored detection test must be prepared in an area separate from where the test is performed. This separation will prevent olfactory fatigue from rendering a subject unable to detect the odor of IAA. Fatigue can occur at very low background levels. To achieve proper results, the jar should be tightly covered and shaken well before each use.

Standard Operating Procedure No. 7

Administering the Isoamyl Acetate Test

Purpose

This procedure should be followed to conduct a qualitative fit test (QLFT) using isoamyl acetate (IAA) as the test agent. Only those persons who have passed the odor detection test (see Standard Operating Procedure 6) should be fit tested by this method.

Preparation

The following items are needed:

1. A fit test chamber (see Standard Operating Procedure 5).
2. Isoamyl acetate also known as isopentyl acetate technical grade 95% pure or better.
3. A syringe or eye dropper with cc or ml markings.
4. A prepared standard atmosphere of 1-2 ppm IAA to test odor sensitivity (see Standard Operating Procedure 6).
5. A test area with good ventilation separate from areas where the IAA sensitivity test and mask selection are done.
6. Appropriate respirators outfitted with organic vapor cartridges. These cartridges are color coded black and should be changed at least weekly.
7. A paper towel or other porous absorbent single-ply material cut approximately 4" x 5" and folded in half.
8. Make a copy of the test exercises and the rainbow passages to be hung inside the test chamber (see Standard Operating Procedure 7). Respirator should be cleaned between test subjects.

Procedure

1. Before beginning this test, the test subject should have completed the IAA sensitivity test describing Standard Operating Procedure 6 and the face piece selection process described in Standard Operating Procedure 3.
2. It is important to minimize the test subject's exposure to IAA to prevent his/her olfactory sense from fatiguing. The odor test, selection, and donning of the mask should occur in one room. The test chamber should be located in another room or should be in such a well-ventilated area that general room contamination is prevented.
3. Before the subject is taken to the IAA test chamber, the respirator should be checked to be certain that it has organic vapor cartridges. The respirator should be donned, the strap should be adjusted and the mask should be seeded by moving the head rapidly from side to side and up and down and by taking a few deep breaths. A positive or negative pressure test should then be conducted. The subject with the respirator on should be taken to the fit test chamber. When the subject has entered the test chamber, the absorbent paper should be folded in half and using the calibrated syringe or eye dropper, ½ cc of full strength IAA should be applied. Hand the towel to the subject who should clip the folded saturated towel to the binder clip or hang it from the hook provided in the center chamber ceiling. NOTE: Studies show that the following amounts of IAA applied to a 4" x 5" paper towel generate various concentrations in the fit test chamber.

<u>CCIAA</u>	<u>CONC IAA(PPM)</u>	<u>DURATION</u>
½	150	1 TEST
1	200	1 TEST
5	220	½ HOUR
10	290	1 HOUR

Allow 2 minutes for the IAA test concentration to be reached before starting the fit test exercises. This would be an appropriate time to talk with the test subject to explain the fit test, the importance of his/her cooperation, the purpose of the test exercises or demonstrate some of the exercises. If at any time during the test the subject detects the banana-like odor of IAA, he/she should quickly exit from the test chamber and leave the test tray to avoid olfactory fatigue. Upon returning to the selection room, the subject should remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, etc. The process continues until the respirator that fits well has been found. Should the odor sensitivity test be failed, the subject should wait about 5 minutes before retesting. Odor sensitivity will usually have returned by this time. If a person cannot be fitted with the selection of half-face respirators, include full-face models in the selection process. When a respirator is found that passes the test, its efficiency can be impressed upon the subject by having them break the face seal and take a breath before they exit the chamber.

Standard Operating Procedure No. 8

Test Exercise

Purpose

Respirator face piece fit testing should require the subject to perform exercises during the fit test. Exercises representing typical movements performed during work as well as those movements which stress usual areas of face piece leakage should be included. The following procedure has been selected because it meets these criteria.

Procedure

Before test exercise begins, the subject should have selected a respirator as outlined in SOP 3. The respirator should have been donned properly and the subject should be ready for fit testing. Exercises to be performed are given in Table 1. Each exercise should be performed for at least 30 seconds. A copy of the exercises can be hung inside the fit test chamber. The instructor should be certain that each exercise is correctly performed by the test subject.

Table 1

Test Exercises

1. Normal breathing.
2. Deep breathing. Be certain breaths are deep and regular.
3. Turning head from side to side. Be certain movement is complete with one turn about every second.
4. Alert the test subject not to bump the respirator on his shoulders. Have the test subject inhale when his head is at either side. For nodding head up and down, be certain motions are complete and made about every second. Alert the test subject not to bump the respirator on his chest.
5. Talking. The paragraph to be read is called the Rainbow Passage. Be certain the paragraph is read aloud and slowly.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. A rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch with its path high above and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach his friends say he is looking for the pot of gold at the end of the rainbow.

6. Normal breathing. Other exercises such as running in place, bending over, and moving head, etc., may be added to further enhance the adequacy of this test.

Standard Operating Procedure No. 9
Functional Fit Test: The Positive Pressure Test

Purpose

This test is performed to help the wearer assess respirator function and find gross leaks between the face and face piece. The positive pressure test checks the presence and functioning of the respirator inhalation valves as well as leakage which may occur due to improper cartridge seal or respirator face seal. This test or a negative pressure test is required by 29 CFR 1910.134 (E) (5) (I) prior to use of any respirator in a contaminated or potentially contaminated atmosphere.

Procedure

1. Block off the exhalation valve cover openings(s).
2. The person exhales gently creating a slight positive within the face piece.
3. Positive pressure should be maintained for at least 5 seconds.
 - a. If no outward leakage is detected, the person has passed the test.
 - b. If leakage is detected (usually felt as a cool sensation against the skin or loss of pressure hold), the respirator is either malfunctioning or a gross leak between the face and face piece is present.
4. The following should be done when a failure occurs:
 - a. Redon or readjust the respirator.
 - b. If the face piece continues to lose pressure, although previous positive or negative pressure tests performed with that respirator had passed, it is probably malfunctioning. Consult with your supervisor. It is also possible for new scars, wrinkles, beard growth, missing teeth or dentures, significant weight gain or loss, etc. to cause gross leakage into the face piece. When such a new condition exists, re-evaluation of the respirator fit must be performed by exposure to a test atmosphere.
 - c. If the person is selecting a respirator before being qualitatively fit tested and fails either the positive or negative pressure, a gross leak is probably present between the face and the face piece. Another respirator brand or size should be chosen.

Standard Operation Procedure No. 10

Functional Fit Test: The Negative Pressure Test

Purpose

This test is performed to help the wearer assess respirator function and to find gross leaks between the face and face piece. This negative pressure test checks the pressure and functioning of the respirator exhalation valve as well as the leakage due to improper cartridge seal or respirator face fit. This test, or a positive pressure test, is required by 29 CFR 1910.134 (E) (5) (I) prior to the use of any respirator in a contaminated atmosphere.

Preparation

The following items are needed:

1. Two disposable latex gloves or other soft flexible impervious material.

Procedure

1. Block off the respirator cartridge inlet openings with gloves or palms of hands. If using hands, be careful not to press too hard on the face piece, as it will artificially improve the seal.
2. The person inhales gently holding that negative pressure for at least 5 seconds.
3. If no inward leakage of air is detected, the person has passed the test.
4. If leakage is detected (usually felt as a cool sensation against the skin or a loss in pressure) the respirator is either malfunctioning or a gross leak between the face and face piece is present.
5. The following should be done when a failure occurs.
 - a. Redon or readjust the respirator.
 - b. If the face piece continues to lose pressure, although previous negative or positive pressure tests performed with that respirator had passed, it is probably malfunctioning. Consult your supervisor. It is also possible for beard growth, new scars or wrinkles, missing teeth or dentures, significant weight gain or loss, etc., to cause gross leakage into the face piece. When such new conditions exist, re-evaluation of respirator fit must be performed.
6. If the person selecting the respirator before being qualitatively fit tested, fails either the positive or negative pressure test, a gross leak is probably between the face and the face piece. Another respirator brand or size should be chosen.

Respirator Fit Test Protocol

Sensitivity Test

Employee selects respirator

Employee performs positive and negative pressure tests

Does employee detect leak?

Select new respirator
Start procedure over

Yes

No

Wear respirator for 5-10 minute period

Is the respirator comfortable?

Yes

No

Select new respirator
Start procedure over

Perform irritant smoke test using HEPA Cartridge

Does Employee indicate leakage?

Yes

No

Perform IAA Fit Test using organic vapor cartridge

Does employee detect IAA?

No

Yes

Loosen cartridge to demonstrate the protection that the respirator provides

Employee completes data form and signs it

APPENDIX B

Respiratory Equipment Inspection Checklist

1. **Disposable Respirators** - Check for:
 - holes in filter (obtain new respirator)
 - straps for elasticity and deterioration (obtain new respirator)
 - metal nose clip for deterioration (obtain new respirator)

2. **Air-Purifying Respirators** - (half mask, full face piece, hood or helmet)
 - a. **Rubber Face Piece** - Check for:
 - excessive dirt (clean all dirt from face piece)
 - cracks, tears, or holes (obtain new respirator)--full face respirators
 - cracked, scratched, or loose fitting lenses

 - b. **Head Straps** - Check for:
 - breaks or tears (replace head straps)
 - loss of elasticity (replace head straps)
 - broken or malfunctioning buckles (obtain new straps & buckles or respirator)

 - c. **Inhalation Valve and Exhalation Valve** - Check for:
 - detergent residue, dust particles, or dirt on valve or valve seat (clean with soap and water)
 - cracks, tears, or lack of flexibility in the valve material (obtain new valve(s))
 - cracks and flexibility of valve seats (obtain new respirator)

 - d. **Filter Elements** - Check for:
 - proper filter for the hazard
 - worn threads - both filter and face piece threads (replace filter or face piece, whichever is applicable)
 - cracks or dents in filter housing A(replace filter)
 - check to see if cartridge gaskets are in place (if applicable)

3. **Atmosphere Supplying Respirators**
 - a. Self Contained Breathing Apparatus (SCBA)
 - consult manufacturers literature

Proper Cleaning and Storing of Respirators

1. Remove cartridges and either discard or store separately from the respirator.
2. Immerse entire respirator in a container with soap and warm water.
3. Wash thoroughly with hands, sponge or small brush. Clean the inside and outside of respirator. Before rinsing, be sure the valves have remained on the respirator.
4. Rinse respirator in clean water. An optional step for sanitary purposes is to rinse in a weak solution of Clorox and water (one cup per gallon of water). Again, check to be sure the valves are in place.
- 5.. Air dry over night in a dust free area or pat dry with clean towel.
6. Seal in plastic storage bag and store in a dry area. **DO NOT** store with cartridges.

Appendix C Required

**Information for Employees Using Respirators When Not
Required Under the Standard**

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Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

I have read and understand this information.

Employee Signature Printed Name Date

crRespiratorUse