RESPIRATORY PROTECTION PROGRAM

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INTRODUCTION

This program is designed to help reduce employee exposure to occupational air contaminants such as microorganisms, dust, fumes, mists, gases, vapours and radionuclides. When possible environmental contaminant exposure will be eliminated by either engineering controls (e.g. general & local exhaust ventilation, enclosure or isolation) or substitution of a less hazardous process or material. When neither effective engineering controls or substitution are feasible, the use of personal protective respiratory equipment may be required. The purpose of this program is to determine the following information;

- When respiratory protection is required
- Which type of respirators are required
- Which employees are required to wear respiratory protection
- How respirators are used in the correct and safe manner

This program shall be administered pursuant to the requirements of the Occupational Health & Safety Act, the regulations for Health Care & Residential Facilities and the current standards expressed/contained in guidelines published by:

- Canadian Standards Association – Z94-4-02 – Selection, Use and Care of Respirators
- Population and Public Health Branch of Health Canada
- National Institute for Occupational Safety and Health

RESPONSIBILITIES

Management

Personal Attendant Care Inc., is committed to maintaining a healthy and safe work environment. Personal Attendant Care Inc., is responsible for establishing this respiratory protection program to assist in reducing or eliminating workplace exposure to hazardous materials.

Training Coordinator

- Assume the role of Program Administrator
- Ensure that there is an adequate supply of respirators approved by the program at all times
- Coordinate and monitor the program
- Monitor workplace conditions and potential exposure in order to evaluate the need for respirators
- Modify the program as appropriate
- Identify employees for program participation
- Establish and maintain surveillance on health
- Coordinate respirator fit testing
- Select NIOSH-approved respirators and maintain the respirator inventory.
- Provide training sessions for participants regarding use, care and storage of respirators
- Communicate all changes in regulatory standards or the Personal Attendant Care Inc.s' Respiratory Protection Program to supervisors, employees and the Joint Health & Safety Committee
- Maintain records for this program.
- Review and approve for the use the initial health surveillance form for determining fitness to use a respirator
- Evaluate the physical ability of employees to wear a respirator
- Communicate written results to Senior Management as appropriate

- *Supervisors*
  Ensure that all employees are knowledgeable of the respiratory protection requirements that are or may be required for the areas in which they work
  - Monitor the proper use and care of respirators
  - Implement a cleaning and inspection program for respiratory equipment, including designation of proper storage areas for respiratory equipment
  - Monitor and enforce employee compliance with the Respiratory Protection Program

- *Employees*
  - Wear a respirator when required, due to actual or potential exposure as a condition of employment
  - Fully participate in all aspects of the program including health surveillance, fit testing and training before wearing a respirator
  - Follow instructions for use, care, storage and maintenance of respirators as outlined by this program
  - Remain clean-shaven where the seal on tight-fitting respirators comes into contact with the skin and face
  - Be fully aware of respiratory protection requirements in their work area

- *Joint Health and Safety Committee*
  - Receive concerns regarding the respiratory protection program and communicate these to the supervisor of the department and respiratory protection program administrator
  - Assess ongoing assurance/confidence workers have with the training and fit testing they received under the respiratory protection program during monthly workplace inspections
  - Be involved in the annual review of the program

- *Fit-testing Contractor*
  - Perform fit-testing on respirator users in accordance with the accepted methods such as those established by the CSA standards.

SELECTION OF RESPIRATORY PROTECTIVE EQUIPMENT

HAZARDS ASSESSMENT

- A hazard assessment must be conducted to identify the hazards in the workplace and to establish appropriate controls
- The hazard assessment may be conducted by an in-house expert or by an external contractor.Regardless of who does the assessment, the person chosen must be competent through education and experience
- A hazard assessment for an infectious agent should identify:
  - Which infectious agents are present?
  - What is the mode of transmission?
  - Where in the workplace is the agent present?
  - Who may be exposed? High risk/low risk?
  - When will the exposure take place?
  - What will the extent of the exposure be?
  - What existing control measures are in place?
- It is recommended that the hazard assessment include a classification of workplace parties according to their risk of exposure. For instance, staff working in an emergency department will be at greater risk of encountering unknown or undiagnosed infectious agents than will staff who work in a non-medical area of a hospital. The classification of workers according to risk will be

important in prioritizing who is to receive new resources, equipment, training or fit-testing when the need arises.

RESPIRATOR SELECTION

Air-purifying respirators clean the contaminated atmosphere through the use of filters, absorbents, or chemicals. Air-purifying respirators can only be used where there is sufficient oxygen to sustain life and the air contaminant level is within specified limitations of the respirator.

For many infectious agents, the identification of appropriate respirators has been done by experts working in the field of both occupational hygiene and infection prevention and control.

Workers using respirators must be specifically trained for the respirator that they are planning to use.

Respirators currently approved by Personal Attendant Care Inc. are:

- N95 Respirators
- Currently the accepted minimum standard for most scenarios with airborne infectious agents
- The Ontario Ministry of Labour does not recognize any classification scheme for respirators that is "equivalent" to the NIOSH scheme
- Respirators that re a higher class and efficiency can be used as long as they are NIOSH certified.
- Respirators with an exhalation valve are available but must be NIOSH certified.

The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and colour-coded with the NOISH approval label and that the label is intact and legible.

HEALTH EVALUATION

FOR N95 (or similar)RESPIRATOR USERS

Prior to fit testing and use of a respirator all employees shall complete a health questionnaire (see attached). A positive (Yes) response to any of the contraindications, health or medical issues listed in the questionnaire will require follow-up with the employees medical practitioner.

Supervisors must provide health professionals with information on the type of respirator the employee is required to wear and the conditions under which they will be wearing it.

Important health assessment elements include:

1. Medical History (physical, psychological)
2. Allergies (food, medication, environmental)
3. Medications
4. Other PPE also being worn

Results of medication evaluations must be:

- In writing
- Kept in a confidential location
- Indicate whether the employee can:
  - Use the respirator
  - Use the respirator with restrictions

  - Not use a respirator at all
- Include specific restrictions if indicated

Should an employee identify any contraindications, health or medical issues listed in the Respirator Use Screening Form, they will be required to attend a health care professional for a professional assessment and will be required to provide a completed assessment form signed by the health care professional.

Workers who report that none of the contraindications, health or medical conditions are applicable may use an N95 (or similar) air purifying respirator to be fit-tested for use.

These medical information records will be treated as confidential.

Medical conditions known to compromise an employee's ability to tolerate respirator use include:

- Cardiovascular and respiratory disease, including a history of high blood pressure, angina, heart attack, cardiac arrhythmia, stoke, asthma, chronic bronchitis, emphysema
- Reduced pulmonary function caused by other factors, such as prior exposure to respiratory hazards
- Neurological or musculoskeletal disorders, including ringing in the ears and epilepsy
    - Lower back pain may also be a concern if the respiratory protection to be used is heavy or cumbersome such as some powdered air-purifying or supplied-air respirators
- Impaired sensory function, such as perforated ear drums, reduced or absent ability to smell
- Presence of latex allergy or potential for latex allergy (if there is latex in the respirator to be used)
- Psychological disorders including claustrophobia and severe anxiety

In general, normal healthy individuals will not be affected by wearing respirators, particularly the lightweight air-purifying types. The use of more complicated equipment such as a self contained breathing apparatus (SCBA) under emergency conditions, however, warrants a more careful evaluation.

RECORD KEEPING

Medical and health records containing information related to the health of an employee shall be confidential documents maintained in the employee health files in accordance with the existing policies governing confidentiality of worker health records.

Records will be maintained by the program administrator or approved designate.

Record keeping is critical to ensure that:

- Consistent application is ensured
- Concerns are addressed
- Remedial actions are taken
- Due diligence is shown

Records will include:

- Health Evaluations
- Fit-Testing

It is important that records, such as fit-test records, be available for management and staff at all hours, including evenings and weekends. The need for them in may health care and community care settings is unpredictable, and staff may not always have the records available to themselves.

TRAINING

All employees required to wear respirators will be trained every two years in the proper use and care of the respiratory equipment assigned to them. In the alternate year, a review will be conducted to confirm that each respirator user has retained the knowledge and skill taught in the training. If the review shows that the user requires refresher training then it will be provided.

Training will include the following elements:

- Why the respirator is necessary
- How improper fit, usage, or maintenance can compromise the protective effect of the respirator
- The limitations and capabilities of the respirator
- How to use the respirator effectively in routine and emergency situations
- How to deal with respirator malfunctions
- How to inspect the respirator and its seals
- How to put on and take off the respirator
- Procedures for maintenance and storage of the respirator
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

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

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

FIT TESTING PROCEDURES

A qualitative or quantitative fit-test determines the proper fit of the respiratory equipment to the user. Procedures for fit-testing must follow established protocols. Current protocols accepted by Personal Attendant Care Inc. include the protocols listed in CSA Standard Z94-4-02 and the protocols accepted by the Occupational Safety and health Administration (USA).

Employees who are required to wear tight-fitting respirators are not permitted to have facial hair in the seal area of a tight fitting respirator unless they provide:

- A documented religious reason
- A documented medical condition

Employees must provide the program administrator with a written personal statement for a religious exemption and a written physician's statement for a medical exemption. Respiratory protection for these employees will be evaluated on a case-by-case basis.

Fit-Testing shall be performed according to the following schedule:

- Prior issuance of a respirator, but after medical clearance
- Every 2 years for workers required to wear respirators but where asbestos is not a risk factor.

Fit-Testing is also required if any of the following conditions occur:

- Significant weight gain or loss
- Dental changes
- Facial scarring
- Cosmetic surgery

It is the employees responsibility to ensure that their respirators fit prior to each use by performing negative and positive seal checks.

The employer shall conduct fit testing using the following procedures. The requirements in this document apply to all OSHA accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

4. The test subject shall be instructed to hold each chosen face piece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable face pieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
    a. Position of the mask on the nose
    b. Room for eye protection
    c. Room to talk
    d. Position of mask on face and cheeks

7. The following criteria shall be used to help determine the adequacy of the respirator fit:
    a. Chin properly placed;
    b. Adequate strap tension, not overly tightened;
    c. Fit across nose bridge;
    d. Respirator of proper size to span distance from nose to chin;
    e. Tendency of respirator to slip;
    f. Self observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up

and down slowly while taking in a few slow deep breaths. Another face piece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises.

    a. Employers must perform the following test exercises for all fit testing methods prescribed in this appendix, except for the CNP quantitative fit testing protocol and the CNP REDON quantitative fit testing protocol. For these two protocols, employers must ensure that the test subjects (i.e., employees) perform the exercise procedure specified in Part I.C.4(b) of this appendix for the CNP quantitative fit testing protocol, or the exercise procedure described in Part I.C.5(b) of this appendix for the CNP REDON quantitative fit testing protocol. For the remaining fit testing methods, employers must ensure that employees perform the test exercises in the appropriate test environment in the following manner:

        1. Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

        2. Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

        3. Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

4. Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

5. Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

   Rainbow Passage

   When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The 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 reach, his friends say he is looking for the pot of gold at the end of the rainbow.

6. Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

7. Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

8. Normal breathing. Same as exercise (1).

b. Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General
   a. The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

   b. The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

a. Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

1. Three 1 liter glass jars with metal lids are required.

2. Odor free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg. F) shall be used for the solutions.

3. The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

4. The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

5. The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

6. A test blank shall be prepared in a third jar by adding 500 cc of odor free water.

7. The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

8. The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

9. The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

10. If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

11. If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

b. Isoamyl Acetate Fit Test

1. The fit test chamber shall be a clear 55gallon drum liner suspended inverted over a 2foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

2. Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

3. After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

4. A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

5. Upon entering the test chamber, the test subject shall be given a 6inch by 5inch piece of paper towel, or other porous, absorbent, single ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

6. Allow two minutes for the IAA test concentration to stabilize 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, and the purpose for the test exercises; or to demonstrate some of the exercises.

7. If at any time during the test, the subject detects the banana like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

8. If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5

minutes before retesting. Odor sensitivity will usually have returned by this time.

9. If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

10. When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol
The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

1. During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

2. The test enclosure shall have a 3/4inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

3. The test subject shall don the test enclosure.

Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

4. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

5. The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

6. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

7. Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

8. If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

9. If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

10. The test conductor will take note of the number of squeezes required to solicit a taste response.

11. If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

    Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

12. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

13. Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

14. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

b. Saccharin solution aerosol fit test procedure.

    1. The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

    2. The fit test uses the same enclosure described in 3. (a) above.

    3. The test subject shall don the enclosure while wearing the respirator selected in section A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

4. A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

5. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

6. As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

7. The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

8. After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

9. Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

10. The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

11. If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

12. Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. BitrexTM (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The BitrexTM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

1. During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

2. The test enclosure shall have a 3/4 inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

3. The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste

4. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

5. The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

6. To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

7. An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

8. If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

9. If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

10. The test conductor will take note of the number of squeezes required to solicit a taste response.

11. If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

12. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

13. Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

14. The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

b. Bitrex Solution Aerosol Fit Test Procedure.

1. The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.
2. The fit test uses the same enclosure as that described in 4. (a) above.

3. The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

4. A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

5. The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

6. As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

7. The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

8. After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

9. Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

10. The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

11. If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

a. General Requirements and Precautions

1. The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

2. Only stannic chloride smoke tubes shall be used for this protocol.

3. No form of test enclosure or hood for the test subject shall be used.

4. The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

5. The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the buildup of irritant smoke in the general atmosphere.

b. Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

1. The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

2. The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

3. The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

c. Irritant Smoke Fit Test Procedure

1. The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

2. The test subject shall be instructed to keep his/her eyes closed.

3. The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the face piece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

4. If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

5. The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

6. If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

7. Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

8. If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a nonhazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di2ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter)

to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a face piece to quantify the respirator fit.

1. General

    a. The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

    b. The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

    a. Apparatus.

        1. Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.

        2. Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

        3. When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.

        4. The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

        5. The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.

        6. The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the

respirator. The in mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the face piece cavity at least 1/4 inch.

7. The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

8. The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.

9. The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

10. The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

11. The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.

12. When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

13. The limitations of instrument detection shall be taken into account when determining the fit factor.

14. Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

b. Procedural Requirements.

1. When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

2. The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

3. A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

4. Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full face piece respirator.

5. A stable test agent concentration shall be obtained prior to the actual start of testing.

6. Respirator restraining straps shall not be over tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

7. The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full face piece respirators. The test subject shall be refitted and retested.

8. Calculation of fit factors.

    i. The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

    ii. The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

    iii. The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

        A. Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

        B. Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

C. Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

D. The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

$$\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/ff_1 + 1/ff_2 + 1/ff_3 + 1/ff_4 + 1/ff_5 + 1/ff_6 + 1/ff_7 + 1/ff_8}$$

Where ff1, ff2, ff3, etc. are the fit factors for exercises 1, 2, 3, etc.

9. The test subject shall not be permitted to wear a half mask or quarter face piece respirator unless a minimum fit factor of 100 is obtained, or a full face piece respirator unless a minimum fit factor of 500 is obtained.

10. Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount ™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, which allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half mask respirator and a minimum fit factor pass level of at least 500 is required for a full face piece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Portacount Fit Test Requirements.

1. Check the respirator to make sure the sampling probe and line are properly attached to the face piece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

2. Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is

comfortable. This individual shall already have been trained on how to wear the respirator properly.

3. Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self observation in a mirror to evaluate fit and respirator position.

4. Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting face piece, try another size of the same model respirator, or another model of respirator.

5. Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

6. The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

7. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

b. Portacount Test Instrument.

1. The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

2. Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

3. A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator face piece to generate and then maintain a constant negative pressure inside the face piece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage

air flow into the respirator. The CNP fit test method measures leak rates through the face piece as a method for determining the face piece fit for negative pressure respirators. The CNP instrument manufacturer Occupational Health Dynamics of Birmingham, Alabama also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breathe, after which an air pump removes air from the respirator face piece at a preselected constant pressure. The face piece fit is expressed as the leak rate through the face piece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real time pressure trace of the in mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half mask respirator and a minimum fit factor of at least 500 is required for a full face piece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. CNP Fit Test Requirements.

1. The instrument shall have a nonadjustable test pressure of 15.0 mm water pressure.

2. The CNP system defaults selected for test pressure shall be set at 15 mm of water (0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

   (**Note:** CNP systems have built in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low moderate work rate, will allow inter test comparison of the respirator fit.)

3. The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

4. The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

5. The employer must train the test subject to hold his or her breath for at least 10 seconds.

6. The test subject must don the test respirator without any assistance from the test administrator who is conducting the CNP fit test. The respirator must not be adjusted once the fittest exercises begin. Any adjustment voids the test, and the test subject must repeat the fit test.

7. The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

b. CNP Test Exercises.

1. Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.

2. Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

3. Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

4. Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

5. Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

6. Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.

7. Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

8. Normal Breathing. The test subject shall remove and Redon the respirator within a one minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute.

After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

c. CNP Test Instrument.

1. The test instrument must have an effective audio warning device, or a visual warning device in the form of a screen tracing, that indicates when the test subject fails to hold his or her breath during the test. The test must be terminated and restarted from the beginning when the test subject fails to hold his or her breath during the test. The test subject then may be refitted and retested.

2. A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

5. Controlled negative pressure (CNP) REDON quantitative fit testing protocol.

a. When administering this protocol to test subjects, employers must comply with the requirements specified in paragraphs (a) and (c) of Part

I.C.4 of this appendix ("Controlled negative pressure (CNP) quantitative fit testing protocol"), as well as use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in paragraph (b) of Part I.C.4 of this appendix.

b. Employers must ensure that each test subject being fit tested using this protocol follows the exercise and measurement procedures, including the order of

Table A1. CNP REDON Quantitative Fit Testing Protocol	
Exercises(1)	Exercise procedure Measurement procedure
Facing Forward	Stand and breathe normally, Face forward, while holding breath without talking, for 30 seconds. for 10 seconds.
Bending Over	Bend at the waist, as if going to touch Face parallel to the floor, while his or her toes, for 30 seconds. holding breath for 10 seconds
Head Shaking	For about three seconds, shake head Face forward, while holding breath back and forth vigorously several times for 10 seconds. while shouting.
REDON 1	Remove the respirator mask, loosen all Face forward, while holding breath face piece straps, and then Redon the for 10 seconds. respirator mask.
REDON 2	Remove the respirator mask, loosen all Face forward, while holding breath face piece straps, and then Redon the for 10 seconds. respirator mask again.

administration, described below in Table A1 of this appendix.

c. [1] Exercises are listed in the order in which they are to be administered.

d. After completing the test exercises, the test administrator must question each test subject regarding the comfort of the respirator. When a test subject states that the respirator is unacceptable, the employer must ensure that the test administrator repeats the protocol using another respirator model.

e. Employers must determine the overall fit factor for each test subject by calculating the harmonic mean of the fit testing exercises as follows:

$$\text{Overall Fit Factor} = \frac{N}{[1/FF_1 + 1/FF_2 + \ldots 1/FF_N]}$$

Where:
N = The number of exercises;
FF1 = The fit factor for the first exercise;
FF2 = The fit factor for the second exercise; and
FFN = The fit factor for the nth exercise.

NEW FIT TEST PROTOCOLS

A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a peer reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

RESPIRATOR USE

Employees must pass both the health examination and the fit test before wearing a respirator.

Employees may not wear a respirator if they have facial hair or any other condition which interferes with the face to face piece seal or valve function.

Every employee is required to perform a negative and positive seal check prior to respirator use.

The individual who uses a tight fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive or negative pressure checks listed here, or the manufacturers seal check method may be used. User seal checks are not substitute for qualitative or quantitative fit tests.

1. **FACE PIECE POSITIVE AND/OR NEGATIVE PRESSURE TEST**

   a) **Positive Pressure Check**
   Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

   b) **Negative Pressure Check**
   Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakages of air is detected, the tightness of the respirator is considered satisfactory.

2. **MANUFACTURER RECOMMENDED USER SEAL CHECK PROCEDURES**

   The respirators manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates the manufacturer's procedures are equally as effective.

MAINTENANCE OF RESPIRATORY PROTECTIVE EQUIPMENT

All respirators shall be maintained in accordance with CSA Standard Z94-4-02 or the manufacturers' recommendations, provided that the latter are of equivalent effectiveness.

The following methods shall be used to maintain the equipment:

- **Cleaning/Disinfecting**
  Disposable air purifying respirators should be kept as clean as possible. No attempt should be made to clean or disinfect disposable respirators. N95 (or similar) type disposable respirators shall be discarded when they are damaged, wet or damp, or at the end of a work shift.

PROGRAM EVALUATION

A review of workplace hazards and surveillance of the workplace will be conducted by the program administrator, in conjunction with the JHSC, on an ongoing basis to determine the necessity of respiratory protection and the success of the program.

This program will be reviewed and updated to include:

- Changes in legislation, standards, guidelines
- Policy and procedure review
- Results of fit testing
- Knowledge transfer from training activities

- Results of supervisors audits
- Concerns raised by respirator user
- Incidents, injuries or illnesses attributed to respirator use
- Results of health evaluations

Personal Attendant Care Inc.,

RESPIRATORY PROTECTION PROGRAM
MASK-FIT HEALTH EVALUATION QUESTIONAIRRE

This form should be used to communicate the results of a health assessment for respirator used to Personal Attendant Care Inc. Please complete this form PRIOR to participating in Mask Fit Testing.

Employee Name:	Department:
Job:	Phone #:

Type of Respirator: _____ Tight fitting _____ Air purifying, non powdered _____ Disposable _____ Non-tight fitting	 _____ Air purifying – powdered _____ Non disposable _____ Other

To maintain confidentiality, do not specify which condition may apply, simply check yes if any of the below conditions apply to you:

☐ Yes ☐ No

Asthma	Heart disease
Chronic bronchitis	Reduced sense of smell
Lung disease	Reduced sense of taste
Panic attacks	Allergic to citrus
Pregnant	Claustrophobia
Uncontrolled high blood pressure	Chest pain

Has your doctor advised you of any cardiovascular, respiratory or any other condition or illness that is a contraindication to wearing a N95 mask/respirator?

☐ Yes ☐ No

Signature:

Date:

Personal Attendant Care Inc.,

RESPIRATORY PROTECTION PROGRAM
MASK-FIT TESTING FORM

Employee Name:
Mask Fit Screening form reviewed by:

Referred to Physician: ☐ Yes ☐ No

Date of Fit Test
Protocol Used: ☐ Qualitative (bitrex) ☐ Quantitative (portacount)
Presence of: ☐ any unusual facial features ☐ facial hair or ☐ corrective eyewear
Mask(s) Tested: _____ ☐ pass ☐ fail _____ ☐ pass ☐ fail _____ ☐ pass ☐ fail _____ ☐ pass ☐ fail
Education Sheet Provided: ☐ Yes ☐ No
Date:

Personal Attendant Care Inc.,

RESPIRATORY PROTECTION PROGRAM
REPORT OF HEALTH ASSESSMENT FOR RESPIRATOR USE

This form should be used to communicate the results of a health assessment for respirator used to Personal Attendant Care Inc.

Employee Name:	Department:
Job:	Phone #:

Type of Respirator: _____ Tight fitting _____ Supplied Air _____ Air purifying, non powdered _____ Disposable	 _____ Non-tight fitting _____ SCBA _____ Air purifying – powdered _____ Non disposable _____ Other

Please check the following:

☐ This employee **may** wear the above noted respirator
☐ This employee **may not** wear the above noted respirator
☐ This employee **may wear** the above noted respirator with restrictions (see below)

The restrictions for respirator use by this employee are:

Name of health care professional completing this assessment (please print)

Signature:

Address:

Phone Number:

Date:

Respiratory Protection Program

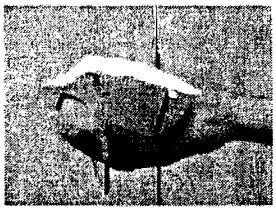
Remember: ONLY wear the mask that you have been fit tested for. Not all N95 masks fit the same.

Proper Procedures for:

Donning (putting on) a Respirator (mask)

1. Wash or disinfect hands.
2. Inspect the mask to ensure straps are firmly attached, it is clean and has no visible holes
3. Cup the respirator with one hand (with straps below the mask) and position the respirator over mouth and nose.

4. Pull the straps over the head with:
   a) the bottom strap placed at the back of the neck and
   b) the top strap being placed at the crown (top) of the head.
5. Set nosepiece by forming the mask to fit **tightly** around the nose and cheeks.
6. Perform user seal check (see below).





User Seal Check

User seal checks are performed each time a respirator is put on.

1. Cup the mask with both hands, covering as much as the respirator as possible.

2. Inhale - the user should be able to identify a slight vacuum within the mask while inhaling.

3. **Exhale** - the user should not feel air leakage from around the edges of the respirator.

4. Inhale again to create a strong seal.

Removal of a Respirator (mask)

When removing the mask, it should be considered to be contaminated and therefore direct contact with the face piece should be avoided. Always wash hands prior to and after removing your mask.

These respirators must be removed using the straps in order to avoid handling the contaminated face-piece. Follow these steps when removing a disposable N95 respirator:

1. Wash or disinfect hands.

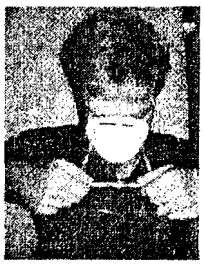
2. Lean forward.

3. Using your thumbs, **grasp both straps at the same time**, from the back of your neck and move up towards the front (top) of your head (straps can be removed one at a time, provided care is taken not to touch the face piece)

4. Lift them over your head slowly and so that the mask moves down and away from the face.

5. Using the straps, dispose of the respirator in an appropriate receptacle.

6. Wash or disinfect hands.

You will need to be re-fit for your mask if you lose or gain a significant amount of weight. 20 lbs is often used as a guideline.