Respiratory Protection Program
For N-95 Disposable Particulate Respirators

Kean University Health Services

PEOSH Respiratory Protection Standard
(29 CFR 1910.134)

Updated September, 2020
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Disposable N95 Respiratory Protection Program
For Student Health Services

1.0 Purpose and Applicability

It is the policy of Kean University Student Health Services to protect the health and safety of its employees by (1) eliminating hazardous exposures whenever feasible; (2) using engineering and administrative controls to minimize hazardous exposures that cannot be eliminated; and (3) using respiratory protection and other personal protective equipment when the frequency and duration of exposures cannot be substantially reduced or eliminated.

The purpose of this respiratory protection program (RPP) is to maximize the protection afforded by respirators when they must be used. It establishes the procedures necessary to meet the regulatory requirements described in the PEOSH Respiratory Protection Standard (29 CFR 1910.134).

This program applies to all Student Health Services (SHS) personnel who are required to wear respirators during emergency medical response operations. Expenses associated with required medical evaluations, fit-tests, training and respiratory protection equipment will be borne by the employer, Kean University, as required by the PEOSH Respiratory Protection Standard.

2.0 Responsibilities

2.1 Respirator Program Administrator

The Associate Director for Environmental Health and Safety (EHS) and/or her designee will be the Respiratory Protection Program Administrator (“program administrator”). The program administrator has received appropriate training and is knowledgeable about the requirements of the PEOSH Respiratory Protection standard and all elements of the respiratory protection program that need to be implemented to be effective.

The duties of the program administrator are to oversee the development of the respiratory protection program and make sure it is carried out at the workplace. The administrator will also evaluate the program regularly to make sure procedures are followed, respirator use is monitored and respirators continue to provide adequate protection when job conditions change. Responsibilities include:

- Be familiar with the PEOSH Respiratory Protection Standard
- Identify tasks that require respiratory protection
- Develop the written respiratory protection program
- Select respirators
- Arrange for medical clearance and distribute questionnaire
- Arrange for and/or conduct initial and annual fit-testing
- Coordinate initial and annual respirator training
- Monitor respirator use, maintenance, disposal and storage
- Maintain records required by the program
- Evaluate and update the program as needed
- Monitor PEOSH standards for changes
2.2 Director of Health Services

The Director of Student Health Services and/or her designee will assist the Program Administrator in ensuring that the respiratory protection program is implemented, understood, and followed by SHS staff. Duties include:

- Participate in the hazard assessment by evaluating all potential exposures to respiratory hazards, and communicating this information to the program administrator.
- Identify employees and/or tasks for which respirators may be required and communicate this information to the program administrator.
- Enforcing the proper use of respiratory protection when necessary
- Be responsible for ensuring that employees in their department follow the procedures outlined in the written plan.
- Schedule employees for medical evaluations, training, and fit testing and ensure that they are allowed to attend these appointments during work hours.
- Observing staff for any signs and symptoms that are related to the ability to use a respirator and referring them for a medical re-evaluation.
- Maintain records required by the program
- Alerting the program administrator if respiratory protection needs to be changed

2.3 Employees in the Program

Employees assigned to jobs/tasks requiring the use of a respirator will:

- Complete the mandatory Respirator Medical Evaluation Questionnaire and any medical evaluation requirements deemed necessary by the evaluating health care professional.
- Care for and maintain their respirators as instructed, and store them in a clean and sanitary location.
- Inform the program administrator if the respirator no longer fits well and request a new one that fits properly.
- Inform the program administrator of any respiratory hazards that they feel are not adequately addressed and of any other concerns they have regarding the program
- Adhere to SHS policies on facial hair (i.e., no facial hair) and respirator seal protection.
- Attend annual training and respirator fit testing as required in the RPP.
- Use, maintain, and dispose of respirators properly in accord with training and the procedures in the RPP.

3.0 Respirator Selection

3.1 Hazard Assessment/Biological Hazards

The Program Administrator will select respirators to be used based on the hazards to which members are exposed and in accordance with all PEOSH standards. The Program Administrator will conduct a hazard evaluation for each operation, process, or work area where airborne contaminants may be present in routine operations or during an emergency. The evaluation shall include a reasonable estimate of employee exposures to respiratory hazards and an identification of the contaminant’s chemical state and physical form. The Program Administrator must revise and update the hazard assessment as needed (i.e., any time work process changes may potentially affect exposure or the nature of the hazards change).
Based on an evaluation of current job tasks which place SHS personnel at risk of exposure to biological hazards the program administrator has determined that the airborne infectious agents to which SHS staff could potentially be exposed includes, **but is not limited to:**

- Coronavirus, a large family of viruses that cause a number of illnesses ranging from the common cold to SARS, MERS, and CORVID-19.
- Influenza - A disease that is caused by a virus and infects the nose, throat, and lungs.
- Measles, a respiratory disease caused by the rubeola virus that causes fever, runny nose, cough, and a rash all over the body.
- Tuberculosis, a disease caused by Mycobacterium tuberculosis that usually attacks the lungs.

Based on this hazard assessment, respiratory protection is required for all SHS personnel involved in direct patient care of patients with signs and symptoms of airborne diseases.

The program administrator will select the types of respirators to be used by staff based on the hazards to which employees may be exposed and in accord with PEOSH regulations and Centers for Disease Control and Prevention (CDC) and other public health guidelines. With input from the respirator user, the program administrator and supervisor will conduct a hazard assessment for each task, procedure, or work area with the potential for airborne contaminants. Based on an evaluation of current job tasks which place SHS personnel at risk of exposure to biological hazards, the program administrator has determined that the airborne infectious agents most likely to be encountered include measles, chickenpox, and influenza and other serious novel flu-like illnesses.

Based on this hazard assessment, respiratory protection is required for **all SHS personnel** involved in direct patient care of patients with signs and symptoms of these airborne diseases.
### TABLE 1 – Examples of Diseases/Pathogens Requiring Airborne Infection Isolation

- Avian influenza/Avian influenza A viruses
- Varicella disease (chickenpox, shingles)/Varicella zoster and Herpes zoster viruses
- Measles (rubeola)/Measles virus
- Novel or unknown pathogens
- Severe acute respiratory syndrome (SARS)
- Tuberculosis (TB)
- Any other disease for which public health guidelines recommend airborne infection isolation

### TABLE 2 – Examples of Diseases/Pathogens Requiring Droplet Precautions

- Diphtheria pharyngeal
- Epiglottitis, due to Haemophilus influenzae type b
- Haemophilus influenzae Serotype b (Hib) disease/Haemophilus influenzae serotype b–Infants and children
- Influenza, human (typical seasonal variations)/Influenza viruses
- Meningitis
- Haemophilus influenzae, type b known or suspected
- Neisseria meningitidis (meningococcal) known or suspected
- Meningococcal disease sepsis, pneumonia (see also meningitis)
- Mumps (infectious parotitis)/Mumps virus
- Mycoplasmal pneumonia
- Parovirus B19 infection (erythema infectiosum)
- Pertussis (whooping cough)
- Pharyngitis in infants and young children/Adenovirus, Orthomyxoviridae, Epstein-Barr virus, Herpes simplex virus
- Pneumonia
- Adenovirus
- Haemophilus influenzae Serotype b, infants and children
- Meningococcal
- Mycoplasma, primary atypical
- Streptococcus Group A
- Pneumonic plague/Yersinia pestis
- Rubella virus infection (German measles)/Rubella virus
- Severe acute respiratory syndrome (SARS)
- Streptococcal disease (group A streptococcus)
- Pharyngitis in infants and young children
- Pneumonia
- Scarlet fever in infants and young children
- Serious invasive disease
- Any other disease for which public health guidelines recommend droplet precautions

### 3.2 NIOSH-Certified Equipment

All respiratory protective equipment shall be approved by the National Institute for Occupational Safety and Health (NIOSH) for the configuration and environment in which it is going to be used. The NIOSH Certified Equipment List is found at the following Internet address: www.cdc.gov/niosh/npptl/topics/respirators/cel. Based on the biological hazards noted above, the following type of respirator will be issued:

- Disposable particulate respirators with filters certified by NIOSH to be at least 95% efficient.

- These respirators are commonly referred-to as N-95 respirators. They can be of the N, R or P series and filter efficiency can be 95, 99 or 99.97% efficient.
The program administrator will be responsible for purchasing a variety of brands and sizes of the appropriate type of NIOSH-approved respirator for fit-testing.

3.3 Updating the Hazard Assessment

The program administrator will revise and update the hazard assessment any time an employee or supervisor identifies or anticipates a new exposure or changes to existing exposures. Any employee who believes that respiratory protection is needed during a particular activity must contact his or her supervisor or the program administrator. The supervisor must contact the program administrator whenever respiratory protection is requested. The program administrator will assess the potential hazard with the employee and supervisor. If it is determined that respiratory protection is needed, all elements of this program will be in effect for those tasks and the program will be updated accordingly.

3.4 Voluntary Use of Respirators

When the use of a respirator is not required by a substance-specific PEOSH standard or by Health Services policies and the program administrator has determined that its use is not necessary to protect the health of the employee, an employee may still request to use a respirator voluntarily.

Employees using respirators voluntarily will be provided with the information in Appendix D to 29 CFR 1910.134 (Appendix B of this RPP). If they are using a respirator other than a filtering facepiece respirator, they will also be provided initial medical clearance and required to clean, store, and maintain the respirator as per the requirements of this RPP. Employees who choose to voluntarily use respirators should advise their supervisor of the need to be included in the applicable sections of the respirator program. If approved, the employees using a respirator other than a filtering facepiece respirator are required to attend annual training provided to those in the full respirator program, as 29 CFR 1910.134(k)(1)(v) requires training in the procedures for cleaning, maintenance and storage of the respirator. If employees voluntarily using respirators are aware of a change that warrants review of medical clearance or repeat fit testing, they should bring that to the attention of their supervisor.

4.0 Medical Evaluation

Persons assigned to tasks that require respiratory protection must be physically able to perform the tasks while wearing a respirator. Employees whose work activities require the use of respiratory protective equipment shall receive medical clearance prior to the use of a respirator and prior to being fit tested for a respirator.

Medical evaluations will be performed by a physician or other licensed health care professional at the University's designated occupational health clinic. To ensure the confidentiality of medical information, the medical evaluation shall not be conducted by the employee’s immediate supervisor and others in the employee’s direct line of authority.

The health care provider listed below will determine individual medical clearance by administering a medical questionnaire and/or providing an in-person medical evaluation. Employees refusing a medical evaluation will not be allowed to work in conditions requiring respirator use.

Before being assigned to work in an area where respirators are required, each employee will complete the questionnaire in Appendix C of this RPP and deliver it to the designated PLHCP. Employees may also speak directly with the PLHCP if they have questions. The PLHCP will be provided with a copy of the RPP,
information from the program administrator about the type of respiratory protection to be used by employees, duration and frequency of respirator use, expected physical effort, other protective equipment worn, and any expected extremes of temperature or humidity.

The PLHCP will review completed questionnaires and make a medical determination as to whether the employee can wear a respirator safely. The PLHCP may make this determination based on the questionnaire alone, but may also require a physical examination of the employee and any tests, consultations, or procedures the PLHCP deems necessary. The PLHCP will provide a written recommendation to the employer, which may clear the employee for all respirator use, or may specify restrictions or limitations on use, such as the type of respirator that may be worn, the duration that it may be worn, and the acceptable level of exertion while wearing the respirator. A copy of this written determination shall also be provided by the PLHCP to the employee.

An additional medical evaluation is required when:

- The employee reports medical signs or symptoms that are related to the ability to use a respirator.
- A PLHCP, supervisor, or the program administrator requests a reevaluation.
- Observations made during fit testing or program evaluation indicate a need for reevaluation (e.g., the employee experiences claustrophobia or difficulty breathing during the fit test).
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, or temperature) that may result in a substantial increase in the physiological burden placed on an employee wearing a respirator.

The program administrator will provide the health care professional with a copy of this program, a copy of the respiratory protection standard and the following information about respirator use and conditions:

- the type and weight of the respirator,
- duration and frequency of respirator use,
- expected physical work effort,
- additional clothing and equipment to be worn,
- temperature and humidity extremes that may be encountered.

If the Respirator Medical Evaluation Questionnaire is administered, this information, as well as information from in-person medical evaluations will remain confidential between the HS responder and the health care professional. The outcome of the medical evaluation is a written recommendation from the health care professional to the Respiratory Protection program administrator or regarding the employee’s ability to wear a respirator. No confidential medical information is contained in this statement. It states only that the SHS personnel is or is not cleared to use an N-95 respirator and whether there are any restrictions.

If the responses on the medical questionnaire indicate to the medical provider that a further medical evaluation is required, this will be provided at no cost to SHS personnel by the medical provider listed above. The PEOSH Respiratory Protection Standard requires that the follow-up medical evaluation include “...any medical tests, consultations or diagnostic procedures the health care professional deems necessary to make the final determination.”

Re-evaluation will be done in the following situations:

- The employee reports signs and symptoms relating to their ability to use a respirator, such as shortness of breath, dizziness, chest pain or wheezing;
- It is identified that the employee is having a medical problem during respirator use;
- The healthcare professional recommends it;
- A change occurs in workplace conditions that may result in increased physiologic burden on the
employee.

5.0 Training

Annual respirator training will be provided for all employees covered by this program. The training will be arranged by or provided by EHS and will include the following:

- The general requirements of the PEOSH Respiratory Protection standard.
- The specific circumstances under which respirators are to be used.
- Respiratory hazards to which employees are potentially exposed during routine and emergency situations.
- Why the respirator is necessary and how proper fit, usage, and maintenance can ensure the protective effect of the respirator as well as how improper fit, usage or maintenance can compromise the protective effect of the respirator.
- The limitations and capabilities of the respirators that will be used.
- How to effectively use the respirators, including emergency situations and situations in which the respirator malfunctions.
- How to inspect, put on, remove, use, and check the seals of the respirator (for tight-fitting respirators such as N95 filtering facepiece respirators).
- The procedures outlined in this program for maintenance, storage, and cleaning or disposal of respirators.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- How and when to safely dispose of a respirator that has been contaminated with infectious biological materials.

Training shall be provided at the time of initial assignment to respirator use, but before actual use, and annually thereafter.

Additional training will be provided when there is a change in the type of respiratory protection used, or when inadequacies in the employee’s knowledge or use of the respirator indicate that he or she has not retained the requisite understanding or skill.

The employee will also receive training during the fit testing procedure that will provide an opportunity to handle the respirator, have it fitted properly, test its facepiece-to-face seal, wear it in normal air to familiarize themselves with the respirator, and finally to wear it in a test atmosphere. Every respirator wearer will receive fitting instructions; including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to perform a user seal check according to the manufacturer’s instructions.

Employees will be given the opportunity during training, annual retraining and throughout the year to provide feedback on the effectiveness of the program and suggestions for its improvement. Training records will be on file at EHS.

6.0 Respirator Use

Employees will follow procedures for proper use of their respirators under conditions specified by this program and in accord with the training they receive on the use of each particular model or type of respirator. The appropriate types of respirators to be used and the exposure conditions are listed in the
respirator selection chart in Appendix A of this RPP.

Respirators relying on a tight facepiece-to-face seal must not be worn when conditions prevent a good seal. Such conditions may be a beard, long moustache, sideburns, or even razor stubble as well as scars, other facial deformities, piercings, and temple pieces on glasses. In addition, the absence of one or both dentures can seriously affect the fit of a facepiece.

Employees and supervisors are expected to be diligent in observing practices pertaining to ensuring the safe use of respirators. To ensure proper protection, the wearer will perform a user seal check, in accord with manufacturer’s instructions and the training provided at the time of fit testing, each time he or she puts on a tight-fitting respirator. Employees who wear corrective glasses or other personal protective equipment must wear these during their fit testing to ensure that it does not interfere with the facepiece seal.

When filtering facepiece respirators are used, respirators should be discarded after each use or sooner if breathing becomes difficult or if the respirator is damaged, soiled, or contaminated.

Employees must leave the respirator use area:

- To adjust their respirator if the respirator is not fitting correctly or impeding their ability to work.
- To wash their face if the respirator is causing discomfort or rash.
- To change the respirator.
- To replace the respirator if it stops functioning as intended, such as changes in breathing resistance or leakage of the facepiece (e.g., fogging of eyeglasses).

6.1 Proper Respirator Use and Disposal

SHS personnel will use their respirators under conditions specified by this program, and in accordance with the training they receive on the use of the selected models. In addition, the respirator shall not be used in a manner for which it was not certified by NIOSH or recommended by the manufacturer.

- SHS personnel are not permitted to wear respirators if they have any condition that prevents them from achieving a tight seal, including facial hair, facial scars or missing dentures. They are not permitted to wear headphones, jewelry or other articles that may interfere with face to facepiece seal. Glasses or goggles should be worn in a way that doesn’t interfere with the seal.
- Prior to donning the respirator, inspect to see if the respirator is damaged, misshapen or soiled. If so, discard the respirator.
- When donning the respirator, determine whether the straps hold the respirator tightly against the face, and if the metal noseclip (if applicable on the chosen model) is in place and functions properly. If not, discard the respirator.
- SHS personnel will conduct seal checks each time they wear a respirator following the manufacturer’s recommended procedures. In general, the seal check involves placing both hands completely over the filtering facepiece, inhaling sharply and repositioning the respirator if air leaks are detected between the face and face seal. If a proper seal cannot be achieved, do not enter a contaminated area.
- If the patient requires airborne precautions alone (i.e., TB), the respirator could be re-used as long as a successful seal can be achieved. If the patient requires contact precautions, discard disposable respirators after each use.
• Personnel should leave a contaminated area if the respirator needs to be changed.

• N-95 disposable respirators should be stored in a clean, dry area where they won’t be crushed or misshapen.

• When caring for infectious or potentially infectious patients, disposable filtering facepiece respirators will be discarded after each use (i.e., patient encounter).

• The respirator must be discarded when it is no longer in its original working condition, whether that condition results from contamination, structural defects, or wear.

7.0 Program Evaluation

The program administrator will conduct a periodic evaluation of the RPP to ensure that all aspects of the program meet the requirements of the OSHA Respiratory Protection standard and that the RPP is being implemented effectively to protect employees from respiratory hazards. This evaluation will be done as needed.

Program evaluation will include, but is not limited to:

• A review of the written program.
• Completion of a program evaluation checklist based on observations of workplace practices.
• A review of feedback obtained from employees (to include respirator fit, selection, use, and maintenance issues) that will be collected during the annual training session.

The RPP will be revised as necessary and records of revisions will be kept on file with the written program. Any procedural changes that are implemented as a result of program evaluation will be communicated to the employees and reinforced by their supervisors.

8.0 Recordkeeping

The program administrator will ensure that the following records are maintained:

• Personnel medical records such as medical clearance to wear a respirator shall be retained by Human Resources as part of a confidential medical record. Medical clearance records must be made available in accord with the PEOSH Access to Employee Exposure and Medical Records standard (29 CFR 1910.1020), and maintained for a minimum of thirty (30) years after an employee’s separation or termination.
• Documentation of training and fit testing will be kept by EHS until the next training or fit test.
• A copy of this RPP and records of program evaluations and revisions shall be kept by EHS and at Student Health Services and made available to all affected employees, their representatives, and representatives of PEOSH upon request.
ABBREVIATIONS AND ACRONYMS

CDC – Centers for Disease Control and Prevention
EHS – Kean University Office of Environmental Health and Safety
SHS – Kean University Student Health Services
NIOSH - National Institute for Occupational Safety and Health
OSHA – Occupational Health and Safety Act/Administration
PEOSH – the New Jersey Public Employee Occupational Safety and Health
PLHCP - physician or other licensed health care professional
RPP – Respiratory Protection Program
# Appendix A: Respirator Assignments by Task or Location

<table>
<thead>
<tr>
<th>Task or Location</th>
<th>Potential Exposure</th>
<th>Respiratory Protection</th>
<th>Employees Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performing, or present during, routine patient care and support operations on a patient suspected or confirmed with a disease requiring Airborne Precautions.</td>
<td>Infectious aerosols</td>
<td>N95 respirator</td>
<td>Clinical Staff</td>
</tr>
<tr>
<td>Entry into airborne infection isolation room or other area occupied by patients suspected or confirmed with a disease requiring Airborne Precautions.</td>
<td>Infectious aerosols</td>
<td>N95 respirator</td>
<td>Clinical Staff</td>
</tr>
<tr>
<td>Cleaning/decontaminating an area occupied by a patient suspected or confirmed with a disease requiring Airborne Precautions, or cleaning/decontaminating such an area after a patient has left but before the space has been adequately ventilated.</td>
<td>Infectious aerosols</td>
<td>N95 respirator</td>
<td>Clinical Staff</td>
</tr>
<tr>
<td>Performing aerosol-generating procedures on patients suspected or confirmed with influenza cases or present during such procedures.</td>
<td>Infectious aerosols</td>
<td>N95 respirator</td>
<td>Clinical Staff</td>
</tr>
</tbody>
</table>
### Clinical Syndromes or Conditions Warranting Empiric Transmission-Based Precautions Pending Confirmation of Diagnosis

<table>
<thead>
<tr>
<th>Clinical Syndrome or Condition&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Potential Pathogens&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Precautions, in Addition to Standard Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningitis</td>
<td><em>M. tuberculosis</em></td>
<td>Airborne Precautions if pulmonary infiltrate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Airborne Precautions plus Contact Precautions if potentially infectious draining body fluid present</td>
</tr>
</tbody>
</table>

### Rash or Exanthems, Generalized, Etiology Unknown

<table>
<thead>
<tr>
<th>If positive history of travel to an area with an ongoing outbreak of viral hemorrhagic fever in the 10 days before onset of fever</th>
<th>Ebola, Lassa, Marburg viruses</th>
<th>Droplet Precautions plus Contact Precautions, with face/eye protection, emphasizing safety sharps and barrier precautions when blood exposure likely. Use N95 or higher respiratory protection when aerosol-generating procedure performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vesicular</td>
<td>Varicella-zoster, herpes simplex, variola (smallpox), vaccinia viruses</td>
<td>Airborne plus Contact Precautions</td>
</tr>
<tr>
<td>Maculopapular with cough, coryza and fever</td>
<td>Rubeola (measles) virus</td>
<td>Airborne Precautions</td>
</tr>
</tbody>
</table>

### Respiratory Infections

<table>
<thead>
<tr>
<th>Cough/fever/upper lobe pulmonary infiltrate in an HIV-negative patient or a patient at low risk for HIV infection</th>
<th><em>M. tuberculosis</em>, <em>Respiratory viruses, S. pneumoniae, S. aureus (MSSA or MRSA)</em></th>
<th>Airborne Precautions plus Contact Precautions</th>
</tr>
</thead>
</table>

<sup>1</sup> Requires confirmatory testing for specific organisms or testing for viruses, bacteria, and fungi when applicable.

<sup>2</sup> Highlights syndromes or conditions where transmission-based precautions are warranted pending confirmation of diagnosis.

<sup>3</sup> Includes empirical coverage for the potential pathogens identified based on epidemiologic data, risk of exposure, and clinical presentation.

<sup>4</sup> Standard precautions include hand hygiene, use of gowns and gloves, use of face protection, and source control.
<table>
<thead>
<tr>
<th>Clinical Syndrome or Condition³</th>
<th>Potential Pathogens⁴</th>
<th>Precautions, in Addition to Standard Precautions</th>
</tr>
</thead>
</table>
| Cough/fever/pulmonary infiltrate in any lung location in an HIV-infected patient or a patient at high risk for HIV infection | *M. tuberculosis*, Respiratory viruses, *S. pneumoniae*, *S. aureus* (MSSA or MRSA) | Airborne Precautions plus Contact Precautions  
Use eye/face protection if aerosol-generating procedure performed or contact with respiratory secretions anticipated.  
If tuberculosis is unlikely and there are no AIIRs and/or respirators available, use Droplet Precautions instead of Airborne Precautions.  
Tuberculosis more likely in HIV-infected individual than in HIV negative individual. |
| Cough/fever/pulmonary infiltrate in any lung location in a patient with a history of recent travel (10-21 days) to countries with active outbreaks of SARS or avian influenza | *M. tuberculosis*, severe acute respiratory syndrome virus (SARS-CoV), avian influenza | Airborne plus Contact Precautions plus eye protection.  
If SARS and tuberculosis unlikely, use Droplet Precautions instead of Airborne Precautions. |

¹Abbreviated and based on Table 2: Clinical Syndromes Or Conditions Warranting Empiric Transmission-Based Precautions In Addition To Standard Precautions Pending Confirmation Of Diagnosis from Appendix A of CDC and HICPAC’s 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. This table is not up-to-date on current pathogens of concern; therefore, public health guidance must be regularly reviewed to understand the potential pathogens and recommended precautions. For examples, see CDC’s latest guidance for novel influenza A viruses associated with severe disease, Middle East Respiratory Syndrome Coronavirus, and Ebola virus disease.  
²Infection control professionals should modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are always implemented, hospitals must have systems in place to evaluate patients routinely according to these criteria as part of their preadmission and admission care.  
³Patients with the syndromes or conditions listed below may present with atypical signs or symptoms. The clinician’s index of suspicion should be guided by the prevalence of specific conditions in the community, as well as clinical judgment.  
⁴The organisms listed under the column “Potential Pathogens” are not intended to represent the complete, or even most likely, diagnoses, but rather possible etiologic agents that require additional precautions beyond Standard Precautions until they can be ruled out.
Appendix B: Information for Voluntary Users

Appendix D to Sec. 1910.134: (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

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 respirator’s 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 designated 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.
Appendix C: Medical Clearance Questionnaire

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

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Your employer must allow you to answer the questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the healthcare professional who will review it.

Part A Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:
2. Your name:
3. Your age (to nearest year):
4. Sex (circle one): Male/Female Gender:
5. Your height: ft. in.
7. Your job title:
8. A phone number where you can be reached by the healthcare professional who reviews this questionnaire (include the Area Code):
9. The best time to phone you at this number:
10. Has your employer told you how to contact the healthcare professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
   a. ___ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
   b. ___ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No If “yes,” what type(s):
Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle “yes” or “no”).

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do you currently smoke tobacco, or have you smoked tobacco in the last month?</td>
<td>☐</td>
</tr>
<tr>
<td>2.</td>
<td>Have you ever had any of the following conditions?</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>a. Seizures</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>b. Diabetes (sugar disease)</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>c. Allergic reactions that interfere with your breathing</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>d. Claustrophobia (fear of closed-in places)</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>e. Trouble smelling odors</td>
<td>☐</td>
</tr>
<tr>
<td>3.</td>
<td>Have you ever had any of the following pulmonary or lung problems?</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>a. Asbestosis</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>b. Asthma</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>c. Chronic bronchitis</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>d. Emphysema</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>e. Pneumonia</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>f. Tuberculosis</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>g. Silicosis</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>h. Pneumothorax (collapsed lung)</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>i. Lung cancer</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>j. Broken ribs</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>k. Any chest injuries or surgeries</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>l. Any other lung problem that you’ve been told about</td>
<td>☐</td>
</tr>
<tr>
<td>4.</td>
<td>Do you currently have any of the following symptoms of pulmonary or lung illness?</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>a. Shortness of breath</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>c. Shortness of breath when walking with other people at an ordinary pace on level ground</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>d. Have to stop for breath when walking at your own pace on level ground</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>e. Shortness of breath when washing or dressing yourself</td>
<td>☐</td>
</tr>
</tbody>
</table>
f. Shortness of breath that interferes with your job  

NO  

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

a. Heart attack

b. Stroke

c. Angina

d. Heart failure

e. Swelling in your legs or feet (not caused by walking)

f. Heart arrhythmia (heart beating irregularly)

g. High blood pressure

h. Any other heart problem that you've been told about

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

a. Frequent pain or tightness in your chest

b. Pain or tightness in your chest during physical activity

c. Pain or tightness in your chest that interferes with your job

d. In the past two years, have you noticed your heart skipping or missing a beat

e. Heartburn or indigestion that is not related to eating

f. Any other symptoms that you think may be related to heart or circulation problems

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

a. Breathing or lung problems

b. Heart trouble
c. Blood pressure

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9. ☐)
   a. Eye irritation
   b. Skin allergies or rashes
   c. Anxiety
   d. General weakness or fatigue
   e. Any other problem that interferes with your use of a respirator

9. Would you like to talk to the healthcare professional who will review this questionnaire about your answers to this questionnaire?

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently)?

11. Do you currently have any of the following vision problems?
   a. Wear contact lenses
   b. Wear glasses
   c. Color blind
   d. Any other eye or vision problem

12. Have you ever had an injury to your ears, including a broken eardrum?

13. Do you currently have any of the following hearing problems?
   a. Difficulty hearing
   b. Wear a hearing aid
   c. Any other hearing or ear problem

14. Have you ever had a back injury?

15. Do you currently have any of the following musculoskeletal problems?
   a. Weakness in any of your arms, hands, legs, or feet
   b. Back pain
   c. Difficulty fully moving your arms and legs
Part B. Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the healthcare professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen?
   If “yes,” do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you’re working under these conditions?

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals?
   If “yes,” name the chemicals if you know them: , ,

3. Have you ever worked with any of the materials, or under any of the conditions, listed below?
   a. Asbestos
   b. Silica (e.g., in sandblasting)
   c. Tungsten/cobalt (e.g., grinding or welding this material)
   d. Beryllium
   e. Aluminum
   f. Coal (for example, mining)
   g. Iron
   h. Tin
   i. Dusty environments
   j. Any other hazardous exposures
      If “yes,” describe these exposures:
4. List any second jobs or side businesses you have: ☐ ☐

5. List your previous occupations: ☐ ☐

6. List your current and previous hobbies: ☐ ☐

7. Have you been in the military services?
   If “yes,” were you exposed to biological or chemical agents (either in training or combat)
   ☐ ☐

8. Have you ever worked on a HAZMAT team?
   ☐ ☐

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications)?
   If “yes,” name the medications if you know them:
   ☐ ☐

10. Will you be using any of the following items with your respirator(s)?
    a. HEPA Filters ☐ ☐
    b. Canisters (for example, gas masks) ☐ ☐
    c. Cartridges ☐ ☐

11. How often are you expected to use the respirator(s) (circle “yes” or “no” for all answers that apply to you)?
    a. Escape only (no rescue) ☐ ☐
    b. Emergency rescue only ☐ ☐
    c. Less than 5 hours per week ☐ ☐
    d. Less than 2 hours per day ☐ ☐
    e. 2 to 4 hours per day ☐ ☐
    f. Over 4 hours per day ☐ ☐

12. During the period you are using the respirator(s), is your work effort:
    a. Light (less than 200 kcal per hour)
       If “yes,” how long does this period last during the average shift:     hrs.   mins.
       Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.
       ☐ ☐
    b. Moderate (200 to 350 kcal per hour)
       If “yes,” how long does this period last during the average shift:     hrs.   mins.
       Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.
c. Heavy (above 350 kcal per hour)

If “yes,” how long does this period last during the average shift: hrs. mins.

Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you’re using the respirator?  
   If “yes,” describe this protective clothing and/or equipment:

14. Will you be working under hot conditions (temperature exceeding 77 deg. F)?

15. Will you be working under humid conditions?

16. Describe the work you’ll be doing while you’re using your respirator(s):

17. Describe any special or hazardous conditions you might encounter when you’re using your respirator(s) (for example, confined spaces, life-threatening gases):

18. Provide the following information, if you know it, for each toxic substance that you’ll be exposed to when you’re using your respirator(s):

   Name of first toxic substance:
   Estimated maximum exposure level per shift:
   Duration of exposure per shift:
   Name of second toxic substance:
   Estimated maximum exposure level per shift:
   Duration of exposure per shift:
   Name of third toxic substance:
   Estimated maximum exposure level per shift:
   Duration of exposure per shift:

   The name of any other toxic substances that you’ll be exposed to while using your respirator:

19. Describe any special responsibilities you’ll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):
Appendix D: Selected Fit Test Protocols

Appendix A to Sec.1910.134: Fit Testing Procedures (Mandatory)

Part I. OSHA-Accepted Fit Test Protocols

A. Fit Testing Procedures--General Requirements.

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both Qualitative Fit Test (QLFT) and Quantitative Fit Test (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 facepiece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable facepieces 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 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 facepiece 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 facepiece 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 would 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.(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. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to conducting 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 3/4-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/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 subsection 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 get 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 for 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 I.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.


The Bitrex® (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 #14 and #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).

C. Quantitative Protocols (QNFT)

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl 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 facepiece 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 facepiece 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 facepiece 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 facepiece 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:

\[
\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/\text{ff}_1 + 1/\text{ff}_2 + 1/\text{ff}_3 + 1/\text{ff}_4 + 1/\text{ff}_5 + 1/\text{ff}_6 + 1/\text{ff}_7 + 1/\text{ff}_8}
\]

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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 facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece 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, that 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 primary CNC instrument manufacturer, TSI Incorporated, also provides probe attachments (TSI mask 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 (elastomeric or filtering facepiece), and a minimum fit factor pass level of at least 500 is required for a full-facepiece elastomeric 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 facepiece 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 facepiece, 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. Modified ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol for full-facepiece and half-mask elastomeric respirators.

(a) When administering this protocol to test subjects, employers shall comply with the requirements specified in Part I.C.3 of this appendix (ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol), except they shall use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in section I.C.3(a)(6) of this appendix.

(b) Employers shall ensure that each test subject being fit tested using this protocol follows the exercise and duration procedures, including the order of administration, described in Table A-1 of this appendix.
### Modified Ambient Aerosol CNC Quantitative Fit Testing Protocol for Full Facepiece and Half-Mask Elastomeric Respirators

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Exercise procedure</th>
<th>Measurement procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bending Over ....</td>
<td>The test subject shall bend at the waist, as if going to touch his/her toes for 50 seconds and inhale 2 times at the bottom.</td>
<td>A 20 second ambient sample, followed by a 30 second mask sample.</td>
</tr>
<tr>
<td>Jogging-in-Place</td>
<td>The test subject shall jog in place comfortably for 30 seconds.</td>
<td>A 30 second mask sample.</td>
</tr>
<tr>
<td>Head Side-to-Side</td>
<td>The test subject shall stand in place, slowly turning his/her head from side to side for 30 seconds and inhale 2 times at each extreme.</td>
<td>A 30 second mask sample.</td>
</tr>
<tr>
<td>Head Up-and-Down</td>
<td>The test subject shall stand in place, slowly moving his/her head up and down for 39 seconds and inhale 2 times at each extreme.</td>
<td>A 30 second mask sample followed by a 9 second ambient sample.</td>
</tr>
</tbody>
</table>

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

2It is optional for test subjects to take additional breaths at other times during this exercise.

5. Modified ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol for filtering facepiece respirators.

(a) When administering this protocol to test subjects, employers shall comply with the requirements specified in Part I.C.3 of this appendix (ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol), except they shall use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in section I.C.3(a)(6) of this appendix.

(b) Employers shall ensure that each test subject being fit tested using this protocol follows the exercise and duration procedures, including the order of administration, described in Table A–2 of this appendix.
TABLE A–2— MODIFIED AMBIENT AEROSOL CNC QUANTITATIVE FIT TESTING PROTOCOL FOR FILTERING FACEPIECE RESPIRATORS

<table>
<thead>
<tr>
<th>Exercises1</th>
<th>Exercise procedure</th>
<th>Measurement procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bending Over</td>
<td>The test subject shall bend at the waist, as if going to touch his/her toes for 50 seconds and inhale 2 times at the bottom2.</td>
<td>A 20 second ambient sample, followed by a 30 second mask sample.</td>
</tr>
<tr>
<td>Talking</td>
<td>The test subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor for 30 seconds. He/she will either read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.</td>
<td>A 30 second mask sample.</td>
</tr>
<tr>
<td>Head Side-to-Side</td>
<td>The test subject shall stand in place, slowly turning his/her head from side to side for 30 seconds and inhale 2 times at each extreme2.</td>
<td>A 30 second mask sample.</td>
</tr>
<tr>
<td>Head Up-and-Down</td>
<td>The test subject shall stand in place, slowly moving his/her head up and down for 39 seconds and inhale 2 times at each extreme2.</td>
<td>A 30 second mask sample followed by a 9 second ambient sample.</td>
</tr>
</tbody>
</table>

1Exercises are listed in the order in which they are to be administered.
2It is optional for test subjects to take additional breaths at other times during this exercise.

6. 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 facepiece to generate and then maintain a constant negative pressure inside the facepiece. 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 facepiece as a method for determining the facepiece 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 breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, 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 facepiece 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 non-adjustable 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 fit-test 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 re-don 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.

7. 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.6 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.6 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 administration described in Table A-3 of this appendix.

<table>
<thead>
<tr>
<th>Exercises 1</th>
<th>Exercise procedure</th>
<th>Measurement procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facing Forward</td>
<td>Stand and breathe normally, without talking, for 30 seconds</td>
<td>Face forward, while holding breath for 10 seconds.</td>
</tr>
<tr>
<td>Bending Over</td>
<td>Bend at the waist, as if going to touch his or her toes, for 30 seconds</td>
<td>Face parallel to the floor, while holding breath for 10 seconds.</td>
</tr>
<tr>
<td>Head Shaking</td>
<td>For about three seconds, shake head back and forth vigorously several times while shouting</td>
<td>Face forward, while holding breath for 10 seconds.</td>
</tr>
<tr>
<td>REDON 1</td>
<td>Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask</td>
<td>Face forward, while holding breath for 10 seconds.</td>
</tr>
</tbody>
</table>
Exercise 2

Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask again.

Face forward, while holding breath for 10 seconds.

Exercises are listed in the order in which they are to be administered.

(c) 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.

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

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

Where:

- \( N \) = The number of exercises;
- \( FF_1 \) = The fit factor for the first exercise;
- \( FF_2 \) = The fit factor for the second exercise; and
- \( FF_N \) = The fit factor for the nth exercise.

Part II. 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.
Appendix E: User Seal Check Procedures

Appendix B-1. to Sec. 1910.134: User Seal Check Procedures (Mandatory)

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 and negative pressure checks listed in this appendix, or the respirator manufacturer’s recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks.

A. Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece 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 facepiece 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 facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer’s Recommended User Seal Check Procedures.

The respirator 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 that the manufacturer’s procedures are equally effective.