A Guide to Developing a Respiratory Protection Program in Iowa

PURPOSE

Employees working in health care settings (including but not limited to long-term care facilities, outpatient clinics, etc.) may need to wear respiratory protection to protect themselves and others from infectious diseases. This guide was created to assist facilities in Iowa that need to develop a Respiratory Protection Program and provide training and fit testing for employees wearing tight-fitting respirators. Developing a Respiratory Protection Program consists of six simple steps. This document discusses the six steps and offers a checklist of items to protect patients, residents, visitors, employees, and employers.

DISCLAIMER

The Iowa Department of Health and Human Services is not a regulatory agency. This document is intended as an educational resource and guidance document only. It is the end user's responsibility to ensure any respiratory protection program they implement complies with all relevant mandates for their specific workplace setting. Any specific questions on meeting safety and regulatory mandates should be directed to the appropriate regulatory authority for that specific workplace setting and not the Iowa Department of Health and Human Services. To contact the Iowa Occupational Safety and Health Administration (OSHA), visit Iowa OSHA.

OCCUPATIONAL HAZARDS

UNDERSTAND RESPIRATORS AND THEIR USE WITH RESPIRATORY HAZARDS

Millions of employees in the United States wear personal protective equipment (PPE) to guard against physical, chemical, and biological hazards in the workplace. Respirators, when used correctly, can protect against airborne hazards such as infectious disease agents or chemicals. However, wearing respirators can put a burden on an employee's health. Some respirators may reduce endurance, visual field, and hearing ability while also increasing the employee's risk for heat stress and psychological stress. For these reasons, employers need to ensure the health of all employees working with and without respiratory protection.

Several options are available to protect the employee and others from respiratory hazards. When employees must wear a tight-fitting respirator to protect their health, the employer must establish and maintain a Respiratory Protection Program following standards set by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.134 – Respiratory Protection). If a tight-fitting respirator is required, employees must be fit tested to ensure the respirator fits correctly.

Four types of protection commonly used to prevent the spread of respiratory infections and examples of situations in which each type should be worn are shown in Table 1. Note that face coverings, such as handmade cloth masks, are not PPE. Face coverings are designed to protect others rather than the user, and have been recommended as source control to reduce the spread of some infectious diseases (such as COVID-19) within a community.

TABLE 1: GENERAL TYPES AND USES FOR RESPIRATORY PROTECTION

TYPE OF MASK				
NAME	Face covering	Surgical mask	Filtering Facepiece Respirator (FFR)	Air Purifying Respirator (APR)
COMMON EXAMPLE	Handmade cloth mask	Disposable 3-ply ASTM F3502-21	N95 respirator	Powered APR (PAPR)
IS IT TIGHT-FITTING?	No	No	Yes	Sometimes
WHAT IS AN EXAMPLE OF WHEN IT SHOULD BE USED?	Close contact* with someone outside of a health care setting during high risk of COVID-19 community transmission	Close contact* with a patient with suspected seasonal influenza	Close contact* with a patient with an infectious disease requiring airborne precautions (e.g., measles)	Close contact* with a patient with suspected infectious disease requiring droplet precautions (e.g., pertussis) when a FFR is not tolerated by the user

*Close contact means being within 6 feet of someone for a cumulative total of 15 minutes or more over a 24-hour period.

For more information on when to use respiratory protection for various infectious diseases, see:

- U.S. Food and Drug Administration: N95 Respirators, Surgical Masks, Face Masks, and Barrier Face Coverings
- CDC: Types of Masks and Respirators
- CDC NIOSH: Understanding and Selecting Respiratory Protection Devices

ASSESS RESPIRATORY HAZARDS IN YOUR FACILITY

An occupational risk assessment must be conducted to understand how to protect employees from respiratory hazards at work. Tasks that may expose staff to airborne infectious disease agents should be identified. A combination of interventions to reduce infectious disease risk in the workplace should be used, as shown in Figure 1.

- First, attempts should be made to eliminate or replace the hazard whenever possible (e.g., restricting sick people from coming to work).
- Second, substituting the hazard (e.g., allowing remote work by staff) could protect some personnel.
- Third, engineering controls (e.g., using visual markings to maintain social distancing) should be considered.
- Fourth, administrative controls (e.g., reminding staff with signs to correctly wear PPE) can promote effectiveness of other interventions.
- Fifth, PPE (e.g., requiring the use of respirators) can be used to protect health care workers and staff.

Identify employees (or job titles) who perform those tasks and determine whether respirator use is required or voluntary. Voluntary respirator use would involve wearing a respirator when the contaminant levels are present but below an OSHA permissible exposure limit (PEL), or when a respirator is not required by the workplace's procedures or policies. Some activities may require respirator use while other activities may allow employees to voluntarily wear respirators. For instance, higher-risk tasks include bathing, dressing, toileting, and aerosol-generating procedures (AGPs). At this time, there is not a definitive and comprehensive list of AGPs for health care settings. However, commonly performed medical procedures that may create potentially infectious aerosols include cardiopulmonary resuscitation (CPR), intubation, extubation, open-suctioning of airways, and bronchoscopy. Lower-risk tasks usually include cleaning and maintenance duties, but staff who perform these activities should be carefully assessed.

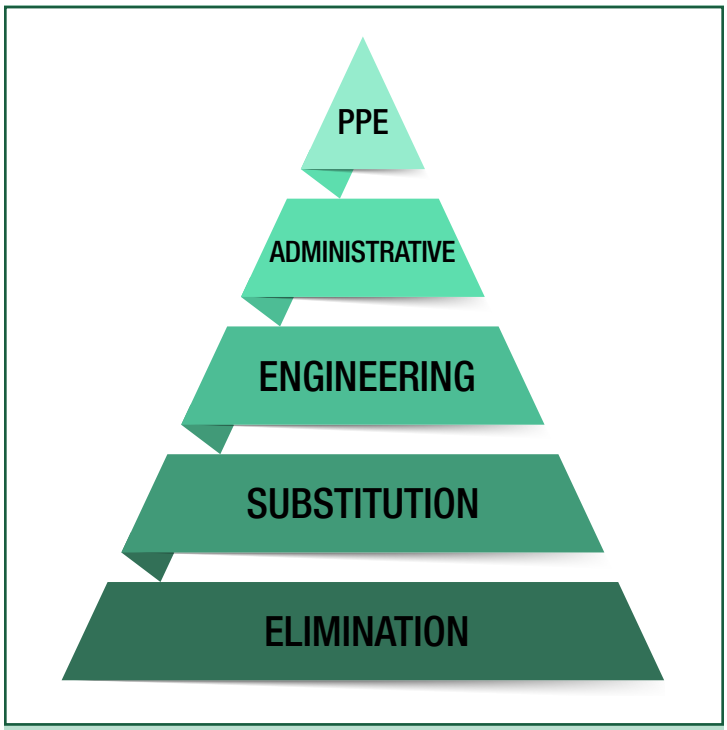

Figure 1. Hierarchy of controls shows the most effective methods (elimination) to least effective methods (PPE) for reducing risks of respiratory infections. *Source: NIOSH*

An employee may feel more comfortable wearing a respirator while performing lower-risk activities where respirators are not required. Employees who voluntarily wear respirators do not need to be included in all aspects of the Program. For instance, employees who voluntarily wear disposable filtering facepiece respirators (FFRs) should receive basic information about their respirator. Employees who voluntarily wear respirators other than disposable FFRs should receive information about their respirator and a medical evaluation to ensure the respirator does not pose a health risk to the employee. In addition, employers do not need to supply respirators to employees who voluntarily wear them. Employees who are required to wear a respirator at work must be included in *all* aspects of the Respiratory Protection Program.

For more information about controlling exposures to occupational hazards in health care settings, visit CDC: Strategies for Optimizing the Supply of N95 Respirators.

PROGRAM STANDARDS

CHOOSE A RESPIRATORY PROGRAM ADMINISTRATOR

The Respiratory Protection Program should detail procedures for all employees to follow. A suitably trained* Respiratory Protection Program Administrator will be assigned to:

- Develop and implement the workplace's Respiratory Protection Program
- Ensure proper respirator use, maintenance, and storage
- Regularly evaluate and update the Program

The Program Administrator may also be responsible for evaluating workplace hazards, training employees, performing respirator fit testing, or maintaining records and other documentation.

*Program Administrators can access training materials, including PowerPoint slides and videos, at the Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa.

WRITE A RESPIRATORY PROTECTION PROGRAM

Once appropriate training is received, the Program Administrator should develop a written Respiratory Protection Program, assess respiratory hazards, and identify staff who will wear respiratory protection in the workplace. A Respiratory Protection Program template is available for download and customization at the the Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa.

Program standards, according to OSHA (29 CFR 1910.134 – Respiratory Protection), include:

- Medical evaluations of employees required to use respirators
- Fit testing procedures for tight-fitting respirators
- Procedures and schedules for cleaning, storing, inspecting, and maintaining respirators
- Training of employees in the proper use of respirators
- Procedures for regularly evaluating the effectiveness of the Program

RESPIRATORS

RECOGNIZE THE DIFFERENT TYPES OF RESPIRATORS

The level of protection a respirator provides varies greatly. Some masks and respirators offer higher levels of protection than others but may be more difficult to wear consistently and comfortably. All respirators used in health care should be approved by NIOSH and authorized by the U.S. Food and Drug Administration (FDA) for use in health care. The table below describes the different types of commonly used respirators (Table 2).

TABLE 2: PHYSICAL AND FUNCTIONAL CHARACTERISTICS OF COMMON RESPIRATORS

TYPE	N95 Filtering facepiece respirator	Half-face Air-purifying respirator	Full-face Air-purifying respirator	Powered Air-purifying respirator
EXAMPLE				
DISPOSABLE?	Yes	No	No	No
EYE PROTECTION?	No	No	Yes	Yes
FIT TESTING REQUIRED?	Yes (unless voluntary use)	Yes	Yes	Sometimes (if tightly-fitted)
ADVANTAGES	Lightweight; easy to take on and off; inexpensive; disposable	Inexpensive, more comfortable; different cartridges for different contaminants; reusable	More effective face seal; different cartridges for different contaminants; eye and face protection; reusable	Protects users with facial hair; cooling effect; low breathing resistance
DISADVANTAGES	Does not filter chemical irritants	Can be hot; communication can be difficult; more maintenance	Can be hot; possible reduced field of vision; communication can be difficult; more maintenance	Can be heavy and awkward to wear; battery requires charging; expensive

Half-face and full-face respirators offer protection for a wider variety of airborne contaminants than FFRs. However, FFRs (such as the N95 respirator) are commonly used in health care settings. As shown in Table 3, FFRs are available in nine different classes – three for each efficiency and three for each oil protection. N95 respirators remove at least 95% of penetrating airborne particles 0.3 microns and larger and adequately protect against most health care exposures. Other types of respirators, such as N99 or N100, can also be used, when tolerated by the employee. Respirators with "R" or "P" classification are more suited for manufacturing industries since they protect against oil-based particles. However, they may be considered for employees working in health care or residential facilities.

TABLE 3: NIOSH PARTICULATE FILTER CATEGORIES

Minimum Filter Efficiency	N series Not resistant to oil	R Series Somewhat resistant to oil	P Series Strongly resistant to oil
95%	N95	R95	P95
99%	N99	R99	P99
100% (99.97%)	N100	R100	P100 (~HEPA)

For more information on the advantages and disadvantages of each type of respirator, see:

- University of North Florida: Respirator Types, Selection, and Use
- CDC NIOSH: Types of Respiratory Protection
- CDC NIOSH: Understanding the Difference

CHOOSE A VARIETY OF RESPIRATORS TO MEET YOUR WORKPLACE NEEDS

Based on the hazards identified previously, select the respirators needed for the tasks being conducted in your workplace. In general, N95 respirators provide adequate protection for most situations encountered by employees working in long-term care facilities and most health care settings. While surgical masks can protect the user from bodily fluids and droplets, N95 respirators should be used as a precaution when treating patients with certain respiratory diseases and particularly during AGPs. In addition to N95 respirators, a selection of reusable APRs can be useful if an N95 respirator is not tolerated due to facial features, fit testing challenges, or eyewear. Reusable APRs can also be used if additional protection is needed for chemical irritants or if there are N95 respirator shortages.

As shown in Figure 2, look for the following features on N95 respirators:

- Rated as N95 Protection (or higher)
- NIOSH in capital block letters
- Model, part, or lot number
- TC-Approval number
- Name or logo of approval holder
- Two head-straps, not ear loops
- Moldable noseband
- No exhalation valves (not recommended for health care settings)

Before purchasing a respirator, thoroughly investigate the company and ask colleagues about their experiences with the products. In addition, request product samples to evaluate quality and effectiveness before purchase. Be especially cautious when purchasing respirators from other countries to avoid counterfeit and ineffective products. Learn more at CDC: Factors to Consider When Planning to Purchase Respirators from Another Country and NIOSH-approved N95 Particulate Filtering Facepiece Respirators.

Once you decide which respirators will work for your workplace, purchase at least two sizes of each model to fit both small and large faces. In times of limited supply, Program Administrators should review current regulations and public health guidance as well as consult with professionals in Occupational Health and Infection Prevention and Control.

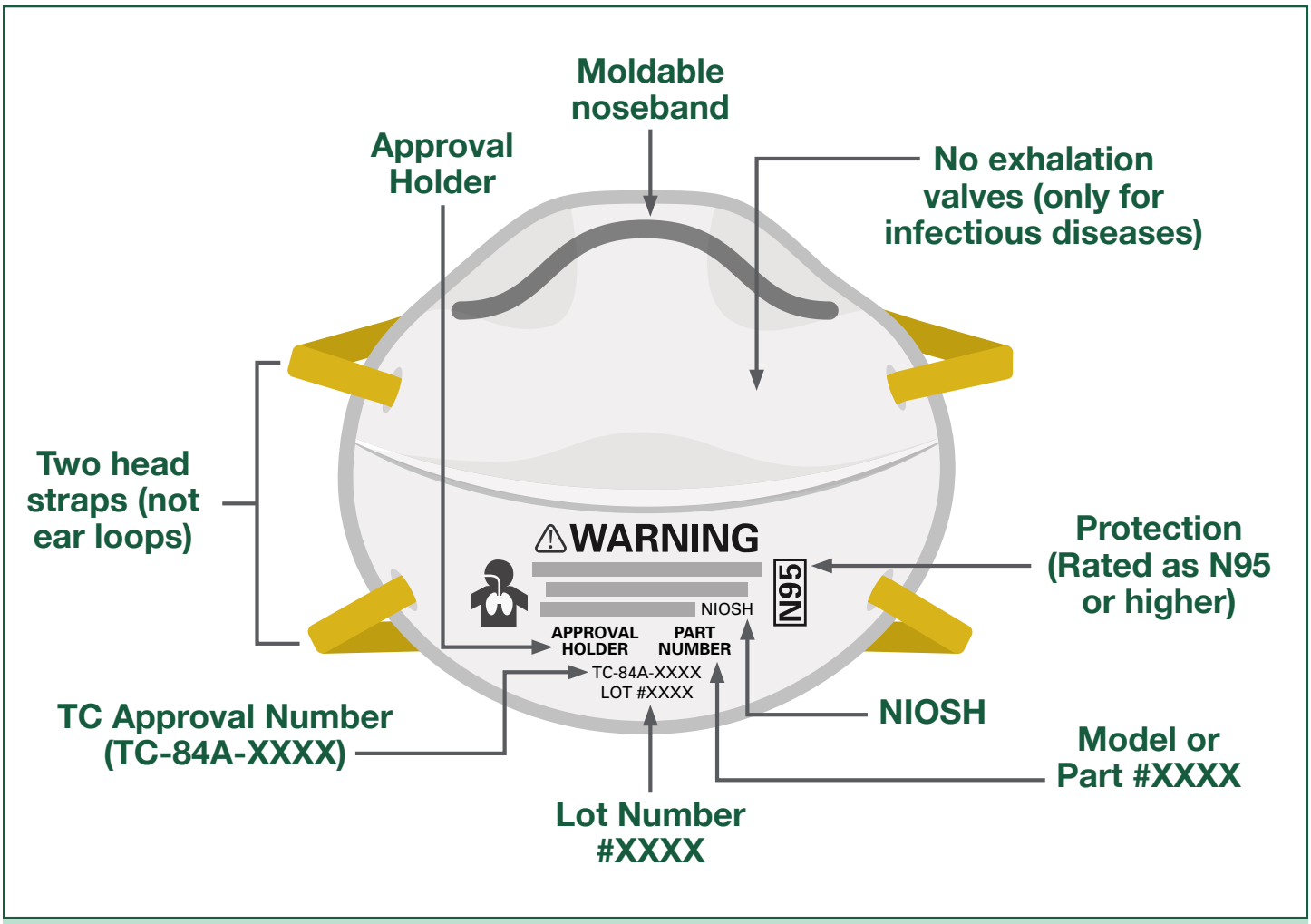

Figure 2. Specific aspects to look for when choosing filtering facepiece respirators, such as N95 respirators, for reducing spread of respiratory infections. *Original Image Source:* *NIOSH: Approved Particulate Filtering Facepiece Respirators*

FIT TESTING KITS

FIND FIT TESTING KITS

Employees who must wear tight-fitting respirators need to be fit tested to ensure they are protected. The employee should undergo either a qualitative or quantitative fit test. A qualitative fit test is a procedure that relies on the employee's ability to taste a test solution and is scored as pass or fail. A quantitative fit test is performed by a machine to measure the amount of leakage around a respirator. While quantitative fit testing requires specialized equipment, most facilities can offer qualitative fit testing once supplies are purchased and appropriate procedures followed.

Several different fit testing kits are available for purchase and should contain everything needed to fit test FFRs and APRs (e.g., hood, nebulizers, and bitter or sweet sensitivity solutions). Fit testing kits do not need to be from the same manufacturer as your facility's respirators, although it may simplify the purchasing process. The list below is not an endorsement of one provider, and there may be other providers for you to use:

- 3M: Respirator Fit Testing
- Moldex: Bitter Qualitative Fit Test Kit
- Zoro: Fit Testing Kit

MEDICAL EVALUATION

MEDICAL QUESTIONNAIRE

REVIEW THE MEDICAL QUESTIONNAIRE

Tight-fitting, air-purifying respirators put a physiological burden on the user. Employees who are required to wear a respirator must complete the OSHA Respirator Medical Evaluation Questionnaire. The employee should answer the questionnaire in a private area during normal work hours at a time and place that is convenient to them.

The employer and supervisor must not look at the responses to maintain confidentiality. Instead, the employee should be told how to deliver the completed questionnaire to a health care provider who can review it. For example, give the employee the questionnaire with a stamped and addressed envelope. Ask them to seal the envelope and mail the questionnaire to the company's Medical Director or other health care provider for review. The medical questionnaire is a medical record and needs to be kept separate from the employee's personnel file.

Some online companies have medical providers on staff who can review the medical questionnaire if needed. In some instances, these online companies allow the entire process to occur online, including the ability to complete the questionnaire online versus on paper. The following list is not an endorsement of one provider, and there may be other online providers for you to use:

- 3M
- Examinetics
- RespClearance
- Rapid MEQ

HEALTH EXAM

DETERMINE IF AN IN-PERSON HEALTH EXAMINATION IS NEEDED

After reviewing the medical questionnaire, an in-person health exam may be needed if:

- Responses to the questionnaire indicate concerns or reasons to assess the employee's pulmonary function (e.g., positive responses to questions 1-8 in Section 2)
- The employee is unable to read English or be assisted with a translator to complete the questionnaire
- The employee reports any signs or symptoms related to respirator use, such as difficulty breathing, shortness of breath, or dizziness

A list of medical providers in Iowa who conduct respirator medical evaluations can be found at the Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa.

RESPIRATOR TRAINING

EMPLOYEE EDUCATION

EDUCATE EMPLOYEES ABOUT RESPIRATORS

All employees must be trained before wearing a respirator. Supervisors who oversee the employees wearing respirators must also be trained. Training must be documented and include several different respirator topics. According to OSHA (29 CFR 1910.134 – Respiratory Protection), employees should demonstrate knowledge of at least the following:

- Why the respirator is needed
- What the respirator does and does not do
- When and how to use a respirator
- When and why fit testing is needed
- How to inspect and seal check the respirator
- How to store and maintain the respirator
- How improper fit, usage, or maintenance can compromise the respirator's protection
- How to use a respirator in unexpected situations and emergencies
- How to recognize signs and symptoms that may affect respirator use

Facilities should have information about respirators readily available if employees have questions or concerns. PowerPoint slides and a Respirator Training Outline and Active Learning Worksheet Template are available at Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa and can be customized by Program Administrators.

TRAINING SCHEDULE

CONDUCT TRAINING AT LEAST ANNUALLY

Training should be conducted at least annually or more often as needed. Repeat training in the following situations:

- Changes in the workplace or employee's tasks
- Changes in the type, make, or model of respirator used
- Inadequacies in the employee's knowledge or use of the respirator
- Any other situation in which retraining appears necessary to ensure safe respirator use

RESPIRATOR FIT

SELECT A COMFORTABLE RESPIRATOR

The employee should choose a respirator that fits comfortably while working. A mirror should be available to help the employee assess the fit and positioning of the respirator. The employee can hold each respirator up to their face and reject any types that do not fit well. The Program Administrator should document the remaining respirator types to note future options. The employee should wear the respirator for at least five minutes to fully assess its comfort.

Questions to help the employee with their decision include:

- How does the respirator fit across the bridge of the nose, cheeks, and chin?
- Is there room for eyewear (if needed)?
- Is there room to talk?
- Is the respirator slipping frequently?
- Is there adequate strap tension?

SEAL CHECK

CHECK THE RESPIRATOR SEAL

The respirator's facepiece-to-face seal should not be compromised. A proper seal between the user's face and the respirator forces air to be pulled through the respirator's filter rather than through gaps in the seal. Look for facial hair, glasses, or jewelry that could interfere with the seal. Hair does not filter harmful particles in the air, and even short stubble can greatly reduce a respirator's protection. For guidance on tight-fitting respirators and facial hair, see Figure 3.

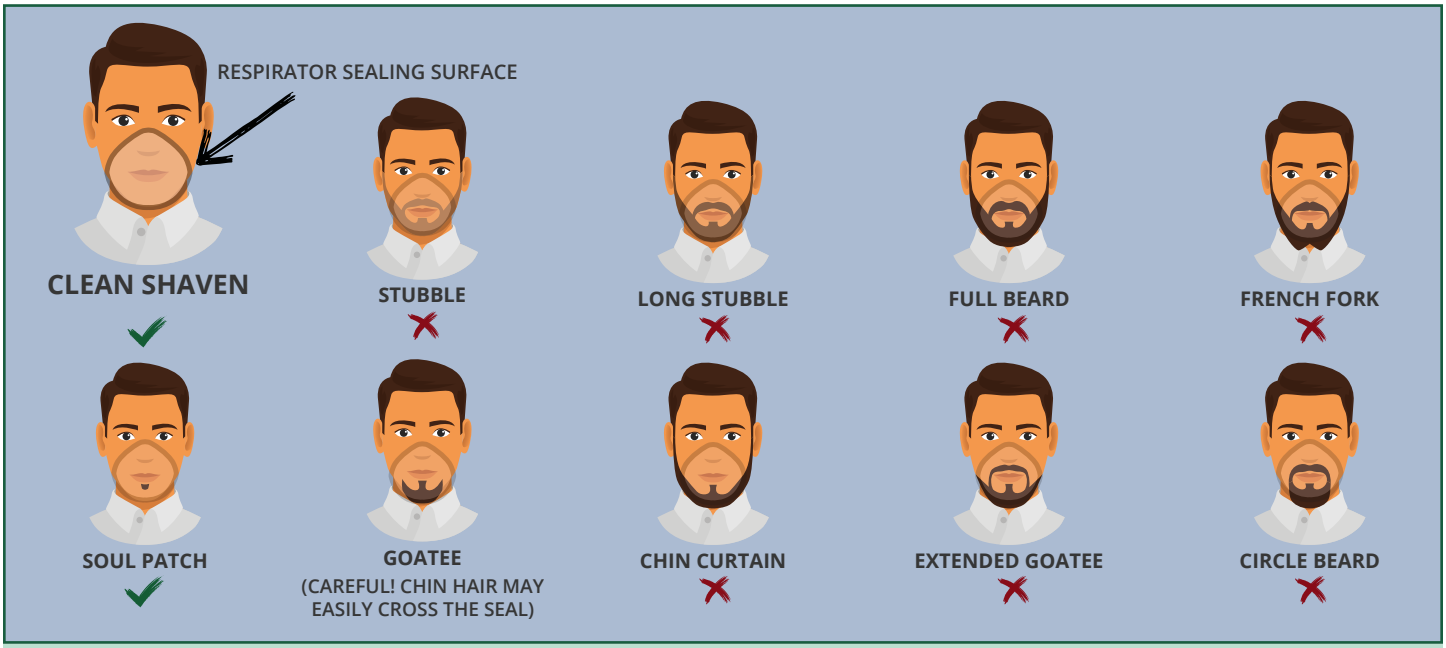

Figure 3. Examples of how various facial hairstyles may or may not interfere with the respirator seal. *Source: CDC NIOSH: Facial hairstyles and filtering facepiece respirators at Facial Hairstyles and Filtering Facepiece Respirators*

Refer to the manufacturer's instructions when conducting seal checks on a particular respirator. In general, a respirator's seal can be assessed with either a positive or negative pressure check. As shown in Figure 4, the user can gently exhale or quickly inhale while covering the respirator with both hands. There is not a tight fit if air leaks, pressure fails to build up, or glasses fog up. The respirator should be readjusted or a different respirator type selected until they find a respirator that is right for them and their job.

Figure 4. Demonstrating the placement of one's hands during a respirator seal check. *Source: CDC NIOSH: How to Properly Put On and Take Off a Disposable Respirator*

A seal check should be performed when initially selecting a respirator and each time the respirator is used. If the employee exhibits any breathing difficulty during the respirator selection process, they should be referred to a health care provider for a medical evaluation. General guidance for checking the respirator's seal can be found at CDC: How do I test the seal on my N95? and CDC: User Seal Check.

QUALITATIVE TESTING

PERFORM QUALITATIVE FIT TESTING

Qualitative fit testing is a simple test to assess the adequacy of respirator fit for each employee. It is a test that is measured by either pass or fail. Employees must be fit tested with the actual make, model, and size of respirator they will wear while performing seven standard exercises (Figure 5). Review manufacturer's instructions of the fit testing kit. Protocols should follow the Respiratory Protection Standard (29 CFR 1910.134 Appendix A). A step-by-step protocol can be found in the Iowa HHS Respiratory Protection Program template (Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa).

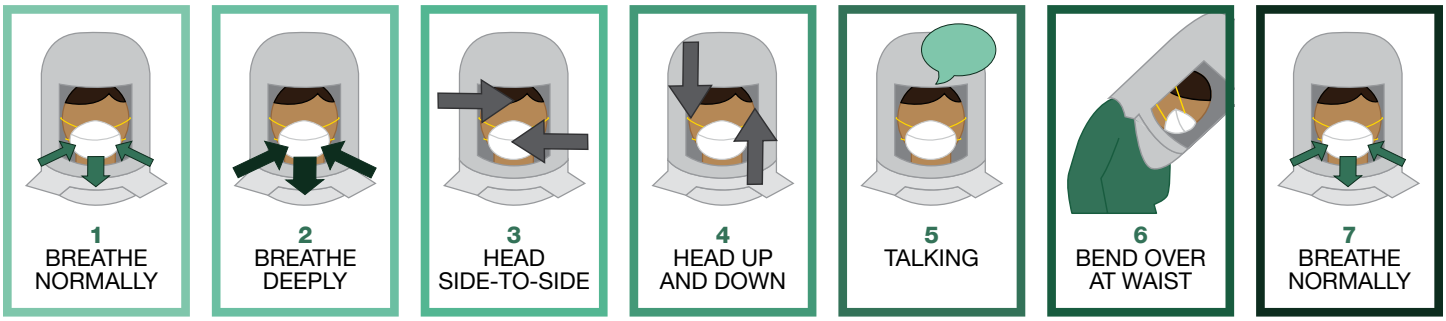

Figure 5. Qualitative fit testing involves performing seven standard exercises while wearing a respirator.

REFER EMPLOYEES WHO NEED QUANTITATIVE FIT TESTING

Quantitative fit testing assesses the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator. This test requires special instrumentation (e.g., PortaCount®) to measure the respirator's fit. Quantitative fit testing is required for certain types of respirators, such as the self-contained breathing apparatus (SCBAs). A list of medical providers in Iowa who perform quantitative fit testing can be found at the Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa.

REASSESS FIT TESTING AT LEAST ANNUALLY

If a respirator does not fit well, it will not protect the employee. According to NIOSH, 10% of subjects failed a fit test after one year using the same make, model, and size of respirator (CDC: Why are annual fit tests required?). Retesting is important annually and after any significant physical changes. For instance, fit testing should be performed after an obvious change in body weight (e.g., weight loss or gain over 20 pounds), extensive dental work, scarring, or cosmetic surgery. The employee must also pass a fit test when a new make, model, or size of respirator is used.

RECORDKEEPING

DOCUMENT FIT TESTING RECORDS

Employers are responsible for maintaining fit testing records until the next fit test is performed. Program Administrators should document fit testing results for each employee to assist with any future fit testing procedures or respirator adjustments. A qualitative fit test form can be found in Appendix E of the Iowa HHS Respiratory Protection Program template (Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa) and customized, as needed.

NOTIFY EMPLOYEES USING THE AVAILABLE EMAIL TEMPLATES

Program Administrators should notify the employee of their fit test results immediately and follow up with written documentation. Employees will then have record of each specific respirator that they passed or failed. Program Administrators can customize email templates available at the Iowa Department of Health and Human Services: Respirators and Fit Testing in Iowa.

MAINTAIN PROTOCOLS AND RECORDS FOR RESPIRATOR USE AND MAINTENANCE

The Program Administrator should reassess and update the Respiratory Protection Program when new staff, tasks, and hazards are identified in the workplace. Respirator cleaning and storage protocols should be readily available to all employees using respirators. Expiration dates should be monitored closely to avoid inappropriate use and respirator replacement delays.

Program Administrators should also conduct regular evaluations of the workplace and its employees to ensure the Respiratory Protection Program is implemented appropriately. Any issues identified should be documented along with recommendations for correction. Maintaining these records will be useful in detecting trends in respirator misuse or inadequate protection.

ACKNOWLEDGMENTS

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- University of Wisconsin-Madison, Wisconsin State Laboratory of Hygiene
- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA)
- Washington State Department of Health

All graphics contained in this guide, unless otherwise credited, were developed by the Center for Food Security and Public Health.

REFERENCES

3M: Respirator Fit Testing. Accessed March 2022.

3M: Respiratory Protection. Accessed March 2022.

Centers for Disease Control and Prevention (CDC): Factors to Consider When Planning to Purchase Respirators from Another Country. Accessed March 2022.

Centers for Disease Control and Prevention (CDC): How do I test the seal on my N95. Accessed March 2022.

Centers for Disease Control and Prevention (CDC): Strategies for Optimizing the Supply of N95 Respirators. Accessed March 2022.

Centers for Disease Control and Prevention (CDC): Types of Masks and Respirators. Accessed March 2022.

Centers for Disease Control and Prevention (CDC): User Seal Check. Accessed March 2022.

Centers for Disease Control and Prevention (CDC): Why are annual Fit Tests required? Accessed March 2022.

Centers for Disease Control and Prevention (CDC) National Institute of Occupational Safety and Health (NIOSH): Facial Hairstyles and Filtering Facepiece Respirators. Accessed March 2022.

Centers for Disease Control and Prevention (CDC) National Institute of Occupational Safety and Health (NIOSH): Understanding and Selecting Respiratory Protection Devices. Accessed March 2022.

Examinetics: Respirator Clearance. Accessed March 2022.

Moldex: Bitter Qualitative Fit Test Kit. Accessed March 2022.

Occupational Safety and Health Administration (OSHA): 29 CFR 1910.134 – Respiratory Protection. Accessed March 2022.

Occupational Safety and Health Administration (OSHA): Worker Exposure Risk to COVID-19. Accessed March 2022.

Rapid MEQ: RapidMEQ. Accessed March 2022.

RespClearance: Online Respirator Medical Evaluation. Accessed March 2022.

University of Iowa: Iowa Medical Providers. Accessed March 2022.

University of North Florida: Respirator Types, Selection and Use. Accessed March 2022.

U.S. Food and Drug Administration (FDA): FDA's Personal Protective Equipment Emergency Use Authorizations for N95 and Other Respirators. Accessed March 2022.

U.S. Food and Drug Administration (FDA): N95 Respirators, Surgical Masks, Face Masks, and Barrier Face Coverings. Accessed March 2022.

Zoro: Fit Testing Kit. Accessed March 2022.