



## RESPIRATORY PROTECTION PROCEDURE

### 1. PURPOSE

11. The purpose of this procedure is to protect the health and safety of university faculty and staff who work in areas that may have irritating or hazardous atmospheres. This procedure outlines the proper implementation, operation and record keeping as required by 29 CFR 1910.134 Respiratory Protection.

### 2. SCOPE

21. This procedure applies to all University faculty and staff who work in irritating or hazardous atmospheres and use a respirator. An irritating or hazardous atmosphere is one that contains levels of dust, smoke, fog, fumes, mists, vapors or gases that meet or exceed levels that are causing irritations or are considered to create adverse health effects by Occupational Safety and Health Administration (OSHA).
22. This procedure covers the selection, use, care, and training requirements of respiratory equipment. It provides requirements for [medical evaluations](#) and fit testing of personnel using respiratory equipment.
23. To prevent occupational exposures caused by breathing contaminated air, the primary objective should be to control atmospheric contamination. This is accomplished as far as feasible by accepted engineering control measures such as enclosed systems, general and local ventilation and substitution of less toxic materials. The use of respiratory protection to reduce exposures to acceptable levels is only allowed in the following circumstances:
  - 23.1. When effective engineering controls are not feasible.
  - 23.2. While engineering controls are being instituted fully or when the engineering controls are under repair.
  - 23.3. During emergency situations.

### 3. DEFINITIONS

31. **Adequate warning properties:** Detectable characteristics of hazardous chemicals including irritation effects and odor.
32. **Air purifying respirator:** A respirator that removes air contaminants from air that surrounds the respirator.

- 33 **Assigned protection factor:** A value that OSHA assigns to a respirator, which indicates the ratio of the concentration of a contaminant in the air versus the concentration inside the face piece of the respirator.
- 34 **Atmosphere-supplying respirator:** A respirator that supplies air from an atmosphere independent from the surrounding atmosphere.
- 35 **Canister or Cartridge:** The container that contains the sorbent, catalyst or filtering material that removes the hazardous ambient material.
- 36 **Ceiling limit:** The concentration of a material that should not be exceeded during any part of the working exposure.
- 37 **Doff:** Taking a device off.
- 38 **Don:** Placing a device on.
- 39 **Elastomeric face piece:** A respirator face piece made of an elastic substance.
- 310 **Emergency Situation:** Means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.
- 311 **End of Service Life Indicator (ESLI):** Means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.
- 312 **Filter:** A medium used to remove solid or liquid particles from the air.
- 313 **Fit factor:** A measurement of the concentration of a substance in the air (inside a test chamber) to its concentration inside the respirator.
- 314 **Hazardous chemical:** A substance that meets OSHA's definition for a health hazard in 29 CFR 1910.1200 (c).
- 315 **Helmet:** Means a rigid respiratory inlet covering that also provides head protection against impact and penetration.
- 316 **Hood:** Means a respiratory inlet covering that completely covers the head and neck and may cover portions of the shoulder and torso.
- 317 **Immediately Dangerous to Life and Health (IDLH):** Atmospheric concentrations of a chemical, or absence of oxygen that will cause fatal injury or irreversible health
- 318 **Negative pressure respirator:** A respirator that maintains a negative pressure inside the face piece when the user inhales and a positive pressure when the user exhales.
- 319 **NIOSH:** National Institute for Occupational Safety and Health.
- 320 **Oxygen Deficient Atmosphere:** Means an atmosphere containing less than 19.5 percent oxygen by volume.
- 321 **Oxygen Enriched Atmosphere:** Means an atmosphere containing more than 22 percent oxygen by volume.
- 322 **Permissible Exposure Limit:** The maximum allowable exposure concentration of a material by OSHA standards, based on 8-hrs per day, 40-hrs per week.
- 323 **Physician Licensed Health Care Professional (PLHCP):** Means an individual

whose legally permitted scope of practice (I.e., license, registration or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required during a [medical evaluation](#).

- 324 **Porta-Count:** Quantitative fit test machine that measures proper fit while the user performs a series of moving, breathing, and talking exercises designed to simulate movements users make in the field.
- 325 **Positive pressure respirator:** An atmosphere-supplying respirator that always maintains a positive pressure inside the face piece.
- 326 **Powered air-purifying respirator (PAPR):** means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.
- 327 **Respirator:** A device used to protect the wearer from inhaling harmful contaminants.
- 328 **Self-contained breathing apparatus (SCBA):** Means an atmosphere-supplying respirator that the breathing air source is designed to be carried by the user.
- 329 **Supplied-air respirator:** A respirator that supplies an independent source of air from a compressed container.
- 330 **Threshold Limit Value (TLV):** The maximum level of exposure to a hazardous substance that is considered safe for most healthy workers.

#### 4. RESPONSIBILITIES

- 41 Risk Management and Safety (RMS) (Program Administrator):
  - 41.1 Develop the Respiratory Protection Procedure that serves to protect University faculty and staff, and complies with OSHA standards.
  - 41.2 Identify workplace atmospheric hazards.
  - 41.3 Arrange for industrial hygiene air monitoring and evaluations.
  - 41.4 Develop and coordinate respiratory protection training.
  - 41.5 Assist in determining the appropriate type of respirator and cartridges that will be used. When purchasing a new respirator, it must be NIOSH approved and appropriate for the specific workplace hazard. A recommended list is below:
    - North 7700 – half face
    - North 7600 – full face
    - North 5400 – full face
  - 41.6 Manage the process which qualifies personnel to wear a respirator, including:
    - Training respirator users (see section 6.2 of this procedure).
  - 41.7 Evaluate procedure annually.
- 42 Supervisors:

- 42.1. Ensure that respirator users receive annual respiratory protection training.
- 42.2. Ensure completion of annual fit testing, annual training and medical evaluations.
- 42.3. Supply the necessary respiratory protection, fit tests and medical evaluations free of cost to their employees.
- 42.4. Communicate important information to RMS when changes occur in their department including a change to a process or protocol, new chemicals being used, and when new employees are hired who need respiratory protection.
- 43. Employees:
  - 43.1. Participate in respiratory training as required.
  - 43.2. Ensure respirator is cleaned, maintained, and stored properly to assure the equipment remains in good working order.
  - 43.3. Remain clean-shaven along the sealing surface of the face to ensure a proper respirator fit to minimize the potential for a leak between the tight- fitting respirator mask and face.
  - 43.4. Attend fit test appointments. A completed [Appointment Authorization Form](#) is required.
  - 43.5. Properly wear respirator including proper donning and doffing of the respirator, adjusting the respirator, and conducting negative and/or positive fit tests prior to using the respirator.
  - 43.6. Report any condition that would warrant more frequent fit testing to supervisor.
  - 43.7. Obtain replacement respirator and air purifying cartridges or canisters as needed.
- 44. Medical Administrator (Notre Dame Wellness Center) (NDWC):
  - 44.1. Conduct medical evaluations for each respirator user to determine employees' physical ability to wear a respirator. A medical questionnaire is required to be completed as part of the evaluation. The [medical questionnaire](#) can be found on the RMS website.
  - 44.2. Maintain accurate medical evaluation records as required in 29 CFR1910.20. The records include the employees name, their duties and the physician's medical evaluation opinion and/or results.
  - 44.3. Ensure fit testing is completed in accordance with 29 CFR 1910.134. Proper records are maintained for each employee on fit testing.

## 5. GENERAL REQUIREMENTS

- 51. All respiratory protection used will be certified by NIOSH. RMS can assist in determining the proper respirator selection.

5.1.1. A respirator is defined as a device to protect the wearer from the inhalation of harmful contaminants. However, under this procedure, RMS does not recognize non-cartridge style, half-face masks as a safe respirator when potentially dangerous levels of ambient chemicals or materials are present. Therefore, such devices will not be used by employees who have a foreseeable potential to exceed their TLV for any airborne material. Non-cartridge style, half-face masks are only to be used as a means of comfort from nuisance levels of contaminants or when respirators are worn voluntarily. When employees are exposed to materials that may potentially expose them to levels that meet or exceed the TLV, half or full face, cartridge style respirators will be used. In the event that a half or full- face cartridge style respirator may not adequately protect the faculty/staff, self- contained breathing apparatus (SCBA) systems or Powered Air Purifying Respirator (PAPR) Helmet/Hood will be used. See Table 1 for Protection Factors for Respirators.

| <b>Table 1<br/>Protection Factors for Respirators</b>                               |                                                                                                          |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Type of Respirator                                                                  | Protection Factor                                                                                        |
| Half-Face Air-Purifying Respirator                                                  | 10 times exposure limit (TLV, etc.), but not above Immediately Dangerous to Life and Health (IDLH) value |
| Full-Face Air-Purifying Tight-Fitting Respirator                                    | 50 times the exposure limit but not above IDLH value                                                     |
| Powered Air-Purifying Respirator (PAPR) Full Face, Helmet or Hood                   | 1000 times the exposure limit but not above IDLH value                                                   |
| Positive Pressure Supplied Air, Full Face Respirator (Atmospheric Supplying)        | 1000 times the exposure limit, but not above IDLH                                                        |
| Positive Pressure Air Line Respirator with an Escape Bottle (Atmospheric Supplying) | 10,000 times the exposure limit, good for IDLH atmospheres                                               |

5.1.2. Engineering and administrative controls to minimize atmospheric hazards should be considered prior to selecting a respirator. If such controls are not feasible then respirators are required. Respirators may also be used in the interim, while engineering and/or administrative controls are being implemented. A respirator should be worn by an employee who has the potential to meet or exceed the TLV and when all feasible engineering and administrative controls are not effective in reducing the potential exposure below the TLV.

5.1.3. Respirators are selected based on the respiratory hazards to which the employee is exposed, and workplace and user factors that affect respirator performance and reliability. Respirators are selected following the identification and evaluation of respiratory hazards in the workplace to ensure that exposure to hazardous substances are maintained at or below the exposure limit as measured outside the respirator. Selection of respirators for any given situation requires consideration of the level of atmospheric oxygen; the types of air contamination, including its physical and chemical properties; and the concentration of air contaminants. The following criteria should be considered:

- The chemical and physical properties of the ambient materials
- The nature of the hazard
- Chemical and physical warning properties
- Health hazard and risks involved with the materials
- The potential exposure levels
- The nature of the work activity and physical demand
- Results of air monitoring, if available or necessary
- The length of time of exposure
- The period of time that the respirator is worn
- Fit testing results
- The limitations and capabilities of the respirator
- Assigned protection factors of the respirator

5.1.4. If the atmospheric level of oxygen is below 19.5% or is above 22%, it is considered an IDLH atmosphere. Respiratory requirements for an IDLH atmosphere are detailed in Section 5.2.

5.1.5. Unknown concentrations of contaminants that have not been characterized through the exposure assessment process, or that cannot be reasonably estimated are considered IDLH. This would apply to most emergency situations. Respiratory requirements for an IDLH atmosphere are detailed in Section 5.2.

5.1.6. Respirators selected for protection against gases and vapors should be either atmospheric-supplying or air purifying. Air-purifying respirators should be equipped with an end of service life indicator (ESLI) designed and certified for removal of the contaminant. If there is no ESLI, a canister or cartridge change schedule should be developed in accordance with manufacturer's recommendations.

## 52 Respiratory Protection for IDLH Atmospheres

52.1. A positive pressure respirator with an escape bottle is worn in IDLH



atmospheres.

52.2. See section 7.9 for procedures to be followed in an IDLH atmosphere.

53 Respiratory Protection for Non-IDLH Atmospheres

53.1. The type of respiratory protection appropriate for the level of contaminant should be worn (Table 1).

5.4.2. Chemical canisters or cartridges specific for the gas or vapor contaminant should be utilized.

6. QUALIFICATION PROCESS

61. In order for employees to be approved to wear respirators on the job, several steps must first be taken so that the University can be assured that health risks are minimized and safe practices observed.

62 Respiratory protection training is required on an annual basis or when other changes in the process used occur. The training includes a discussion of the following items and employees can direct any questions to RMS:

- 62.1. When the respirator is needed
- 62.2. Why the respirator is needed
- 62.3. The hazards to which they may be exposed
- 62.4. The limitations and capabilities of each respirator
- 62.5. The respirator selection for their use
- 62.6. The type and frequency of respirator inspections
- 62.7. How to properly don, doff, wear, adjust, care for, maintain respirator
- 62.8. How to check for a proper respirator fit (negative/positive fit tests)
- 62.9. Respirator malfunctions and emergencies
- 62.10. How to identify signs that the cartridge is not properly working
- 62.11. The basis of the Respiratory Protection Program

63 Medical Evaluations

63.1. Each faculty or staff member who wears a respirator will receive a medical evaluation by a licensed and approved medical professional annually. Faculty or staff members will be notified by the NDWC each year to send their applicable employees to the specified medical provider to receive medical evaluations. However, it is the responsibility of the supervisor to ensure that the employee receives his/her evaluation.

63.2. Medical certification for respirator use is accomplished by:

- [Medical questionnaire](#)
- Administration of a Pulmonary Function Test as directed by the Physician or other Licensed Health Care Professional (PLHCP)
- Interpretation of questionnaire and testing results by the PLHCP
- When an employee is medically certified to wear a respirator, they will

then be fit tested as outlined in “Respirator Fit Tests”, section 6.4 of this procedure.

- Should an employee fail medical certification, the following will be done:
  - Retest pending PLHCP recommendations
  - Refer employee’s failing the medical certification to their supervisor

#### 64 Respirator Fit Tests

- 64.1. Every individual who is required to wear a positive or negative pressure tight-fitting face piece or dust mask respirator will be fit tested on each type and model of respirator he/she may be required to wear. Tight-fitting respirators include air-purifying respirators (half or full face), and air-supplied respirators. This does not apply to voluntary use of respirators.
- 64.2. The fit test will be conducted after the medical ability to wear a respirator has been approved, prior to initial use, and at least annually thereafter, or anytime a change in the employee’s facial features could affect a proper fit.
- 64.3. An additional fit test will be conducted whenever an employee reports or visual observations are made of changes in the employee’s physical and/or medical condition that could affect respirator fit. Such conditions may include facial scarring, facial hair, dental changes, cosmetic surgery or a significant change in BMI.
- 64.4. Quantitative fit testing is the preferred method for respirators. A Porta-Count s used for quantitative fit test.
- 64.5. Qualitative fit testing is acceptable and may be conducted in certain circumstances.
- 64.6. A fit factor of 100 or higher will be achieved for a half face respirator and a fit factor of 500 or higher will be achieved for a full-face respirator before the fit may be considered satisfactory when using the quantitative method.
- 64.7. Positive pressure respirators are fit tested in a negative pressure mode.
- 64.8. Under no circumstances will a fit test be conducted if there is any hair growth between the skin and the face-sealing surface, such as stubble beard growth, beard, mustache or sideburns that cross the respirator-sealing surface. Any type of apparel, which interferes with satisfactory fit should be altered or removed.
- 64.9. An appropriately trained individual will perform fit testing.
- 64.10. Fit testing will be conducted in a manner consistent with manufacturer’s guidelines and recommendations as well as all applicable governmental requirements.
- 64.11. Instructions on how to wear the respirator, adjust it, and how to determine proper fit in the field will be reviewed with the user



prior to conducting a fit test.

## 7. RESPIRATOR USE, CARE AND MAINTENANCE

71. All individuals who are required to use respiratory protection will receive a medical evaluation, fit testing, and appropriate training on each type of respirator prior to using the equipment.
72. Individuals may use only the type, model, and size of respirators for which they have been fit tested (tight-fitting respirator) and trained.
73. In accordance with [29 CFR 1910.134 App B-1](#), respirator users except those using disposable dust mask respirators will conduct a field seal check (fit check) prior to each use to verify a satisfactory respirator to face seal has been established.
74. Personnel will select the proper respirator for the task to be performed according to the procedures stated in Section 5. Guidance as to the appropriate respirator to be used may be obtained through RMS.
75. When the respirator user requires corrective glasses or goggles, they will be of the type not to compromise the integrity of the face to respirator seal. Corrective glasses with temple bars (bows) or straps passing between the face and the respirator mask are not permitted while wearing a respirator. Prescription spectacle inserts for respiratory protection can be obtained.
76. Under no circumstances will a tight-fitting respirator be worn if there is any hair growth between the skin and the respirator-sealing surface. This includes stubble beard growth (i.e., one-day growth), beard, mustache or sideburns that cross the respirator-sealing surface. This does not apply to helmet or hood respirators.
77. Use of skullcaps that project under the respirator face piece (tight-fitting respirator) are not permitted while wearing a tight-fitting respirator.
78. Employees are required to exit the respirator area:
  - 78.1. To wash their faces and respirator as necessary to prevent eye and skin irritation associated with respirator use.
  - 78.2. If they detect vapor or gas breakthrough, changes in breathing resistance or leakage of the face pieces. Employees may not re-enter the respirator area until the respirator or cartridges have been replaced.
79. For respirator use in an IDLH atmosphere, the following procedures will be followed:
  - 79.1. One employee, or when needed, more than one employee will be located outside the IDLH atmosphere. These employees will be trained and equipped to provide effective emergency rescue. This includes positive pressure supplied air respirators with escape bottles. If special equipment is needed to effectively rescue an employee, this equipment will be on scene prior to anyone entering the IDLH atmosphere.

- 7.9.2. Visual, voice, or signal line communication will be maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere.
- 7.9.3. Prior to the employees outside the IDLH atmosphere initiating emergency rescue activities, notification will be made to summon additional help to the scene (notify NDPD 574-631-5555).
- 7.10. Compressed Breathing Air Care and Maintenance
- 7.10.1. Compressed breathing air supplied by a compressor or cylinders will meet or exceed the requirements for Grade D breathing air as described in ANSI/Compressed Gas Association Specification for Air, G-7.1-1989 and will meet the following:
- Oxygen content between 19.5-22%
  - Hydrocarbon content of 5 milligrams per cubic meter of air or less
  - Carbon Monoxide content of 10 PPM or less
  - Carbon Dioxide content of 1,000 PPM or less
  - Lack of noticeable odor
- 7.11. It is the responsibility of the respirator user to properly care for and maintain his/her personal respirator and to notify his/her supervisor when problems are discovered, such as broken or damaged parts, ineffective seals, cartridges that are used up, etc. The following regimen will be observed and conducted by each employee:
- 7.11.1. Cleaning:
- Respirators should be cleaned and disinfected after each day's use.
  - The disinfecting agent used should be recommended by the respirator manufacturer.
  - Emergency use respirators should be cleaned and disinfected after each use and on a monthly basis thereafter.
- 7.11.2. Inspection:
- Respirators will be inspected before each use by the wearer and emergency respirators will be inspected monthly. The inspection includes:
    - Face piece: For dirt, cracks, tears, holes, inflexibility, scratched lenses (in full-face respirators), broken mounting clips, missing gaskets or badly worn threads.
    - Head Straps: For breaks, loss of elasticity or broken buckles.
    - Exhalation valve: For foreign objects, cracks and tears, improper insertion of valve body or missing or defective valve cover.
    - Air purifying elements: For the wrong element (cassette) for the job,



incorrect installation, loose connections, missing gaskets, expiration of shelf- life, cracks or dents in filter, cartridge or cassette.

- Air supply system: For attachments and end fittings and condition of all regulators, valves or other airflow regulators.
- Storage: To prevent problems with respirators, the following storage requirements should be followed:
- Respirators are identified with the user's name.
- Respirators are stored in plastic bags or other sealed container to prevent its exposure to atmospheric elements.
- Respirators are stored in a place that provides protection against degrading elements, such as physical damage, dust, temperature extremes, chemicals, moisture and sunlight.

## 8. VOLUNTARY USE RESPIRATORS

81. Employees may wish for additional protection against ambient materials that are not producing exposures at or near threshold limit values (TLVs) or wish to minimize nuisance levels of ambient materials and therefore choose to wear a respirator. This is considered voluntary use of a respirator.
82. When respirators are used voluntarily, the respirator user completes the Respiratory Protection Voluntary Use Form found under Resources on the [Respiratory Protection Plan page](#).

## 9. TRAINING

91. All personnel required to wear a respirator will be trained on the Respiratory Protection Procedure prior to wearing a respirator and then again annually.
92. Training on the Respiratory Protection Procedure is located within the Respiratory Protection Training course in eNDeavor.

## 10. FREQUENCY OF REVIEW

101. This procedure is reviewed annually and updated as needed to meet applicable regulatory changes by RMS.

## 11. REFERENCES

111. Occupational Safety and Health Administration (OSHA) Standard [29 CFR 1910.134](#)

### Revision History Table

| History                                                                                                                                                                                                                                                                                                         | Effective Date |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Procedure created                                                                                                                                                                                                                                                                                               | August 2017    |
| Added new definitions to section 3 (emergency situation, end of service life indicator (ESLI, helmet, hood, oxygen deficient atmosphere, oxygen enriched atmosphere, physician licensed health care professional (PLHCP), powered air-purifying respirator (PAPR and self-contained breathing apparatus (SCBA). | August 2018    |
| No changes                                                                                                                                                                                                                                                                                                      | August 2019    |
| Restructured section 5.1.4<br>Minor changes made to section 5.1.6<br>Restructured the first bullet point under section 7.10.1                                                                                                                                                                                   | March 2020     |
| Removed PAPR from section 6.4.1                                                                                                                                                                                                                                                                                 | April 2020     |
| Added Appendix C and Appendix D<br>Changed 23.5% to 22% in section 3.20                                                                                                                                                                                                                                         | October 2020   |
| Removed Appendix C and Appendix D                                                                                                                                                                                                                                                                               | January 2021   |
| Removed Appendix B Voluntary Use Form is now completed online                                                                                                                                                                                                                                                   | February 2021  |
| Added 6.4.5 Qualitative fit testing is acceptable and may be conducted in certain circumstances                                                                                                                                                                                                                 | March 2021     |
| Removed Appendix A. Added hyperlinks Medical Evaluation Questionnaire and Appointment Authorization Form                                                                                                                                                                                                        | September 2021 |
| No change                                                                                                                                                                                                                                                                                                       | August 2022    |
| No change                                                                                                                                                                                                                                                                                                       | August 2023    |
| Corrected all links, fixed some spacing issues                                                                                                                                                                                                                                                                  | January 2024   |
| Removed the word shall<br>3.19 Added NIOSH definition<br>3.30 Added TLV definition<br>4.1.5 Changed wording to provide a recommended list of respirators<br>4.3.5 Removed – it was a duplicate of 4.3.4<br>9.2 Changed complyND to ENDeavor<br>Fixed links                                                      | January 2025   |
| 4.2.3 Removed reference to Appendix A                                                                                                                                                                                                                                                                           | October 2025   |