

RESPIRATORY PROTECTION PROGRAM

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Table of Contents

Introduction	3
Respiratory Protection Program Scope • Respiratory Protection Program Administrator	
1. Definitions	3
2. Responsibilities	8
Employer • Employee and Student Health Services • Respirator User • Environmental Health and Radiation Safety Department Laboratory Clearance Inspection • Other University Notifications	
3. Procedures for Selecting Respirators for Use in the Workplace	9
Summary of Potential Respiratory Hazards • Respirator Classifications	
4. Medical Evaluations for Respirator Users	22
Medical Determination • Respirator Classifications	
5. Fit-testing Procedures for Respirators	25
Method • Types of Fit Testing • Fit Test Exercises • Retesting	
6. Procedures for Proper Use of Respirators	28
Respirator Use Under Special Conditions	
7. Procedures and Schedules for Cleaning, Disinfecting, Storing, Inspecting, Repairing, Discarding, and Otherwise Maintaining Respirators	31
Cleaning and Disinfecting • Storing • Inspecting • Repairing, Discarding, and Otherwise Maintaining Respirators • Service Life Information	
8. Training on the Proper Use, Limitations and Maintenance of Respirators	34
9. Training in the Respiratory Hazards to Which They Are Potentially Exposed During Emergency Situations	36
10. Individual Use of Respirators Not Required by Temple University	37
11. Procedures for Regularly Evaluating the Effectiveness of the Program	38
Appendix A: Assessment Tool for NIOSH Decisions Logic for Respirator Selection	39
Appendix B: OSHA Medical Evaluation Questionnaire	46
Appendix C: Respiratory Medical Clearance Form	52
Appendix D: Monthly Respirator Inspection Form	53
Appendix E: Guidelines for Respirator Use	54

Introduction

Respiratory Protection Program Scope

The Occupational Safety and Health Administration (OSHA), under the provisions of the 29 *Code of Federal Regulations* [CFR] §1910.134(c) and appendices, requires Temple University to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. This program applies to all employees, students, and volunteers/visiting scholars who are required to wear or voluntarily wear a respirator.

When effective environmental controls (e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials) are not feasible, or while they are being instituted, appropriate respirators must be used.

Respiratory Protection Program Administrator

The Respiratory Protection Program, designed in compliance with 29 CFR §1910.134(c)(3), must be administered by a suitably trained program administrator who is qualified by appropriate training or experience commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

Kisha Grady, Senior Training Specialist for the Environmental Health and Radiation Safety Department, was appointed as the Respiratory Protection Program Administrator for Temple University by Gregory B. Lupinski, Director of the Environmental Health and Radiation Safety Department.

Principal Investigators, Directors, or Supervisors are responsible for ensuring that employees, students, and volunteers/visiting scholars, under their supervision, seek respiratory protection when it is appropriate. Responsibility for overseeing the implementation of the Respiratory Protection Program for individuals requiring respiratory protection rests with the immediate Principal investigator, Director, or Supervisor and hereafter will be identified as Employer.

Section 1: Definitions

Most definitions in this section can be found in 29 CFR §1910.134(a-b).

Air-Purifying Respirator (APR)

A respirator with an air-purifying filter or cartridge that removes specific air contaminants by passing ambient air through the air-purifying element.

Assigned protection factor (APF)

The workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees, students, and volunteers/visiting scholars when the employer implements a continuing, effective respiratory protection program as specified by this section.

Atmosphere-Supplying Respirator

A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere and includes Supplied-Air Respirators (SAR) and Self-Contained Breathing Apparatus (SCBA) units.

Cartridge

A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Combination Respirators

Are respirators designed to be used in atmospheres that contain hazards of both particulates and gases and use combination cartridges to reduce exposure to these hazards.

Emergency Situation

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.

End-of-Service-Life Indicator (ESLI)

A system that warns the respirator user of the approach of the end of the adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Filtering Facepiece

A negative-pressure particulate respirator with a filter as an integral part of the facepiece composed of the filtering medium.

Fit Factor

A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ration of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit Test

The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual (see also Qualitative fit-test [QLFT] and Quantitative fit test [QNFT]).

Immediately Dangerous to Life and Health (IDLH)

An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Maximum use concentration (MUC)

The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

Oxygen-Deficient Atmosphere

An atmosphere with an oxygen content below 19.5% by volume.

Occupational Exposure Limit

It is an upper limit on the acceptable concentration of a hazardous substance in workplace air for a particular material or class of materials. It is typically set by competent national authorities and enforced by legislation to protect occupational safety and health.

Particulate-removing respirators

A respirator designed to reduce inhaled concentrations of nuisance dusts, fumes, mists, toxic dusts, radon daughters, asbestos-containing dusts or fibers, or any combination of these substances, by filtering most of the contaminants from the inhaled air before they enter the breathing zone of the respirator user.

Physician or Other Licensed Health Care Professional (PLHCP)

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 by 29 CFR §1910.134(e).

Powered Air-Purifying Respirator (PAPR)

An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Qualitative Fit Test (QLFT)

A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative Fit Test (QNFT)

An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respirator User Exposure

Exposure to a concentration of an airborne

contaminant that would occur if the employee were not using respiratory protection.

Self-Contained Breathing Apparatus (SCBA)

An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service Life

The period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-Air Respirator (SAR) or Airline Respirator

An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

User Seal Check

An action conducted by the respirator user to determine if the respirator is properly seated to the face.

Vapor- and gas-removing Respirators

Are respirators designed with sorbent elements (cartridges) that adsorb and/or absorb the vapors or gases from the contaminated air before they can enter the breathing zone of the individual. An example of this type of respirator would be a full- facepiece respirator.

Section 2: Responsibilities

Employer

The employer is responsibility for:

- Implementing the Respiratory Protection Program in their work area.
- Identifying individuals and their jobs or tasks which may require respiratory protection and providing this information to the Respiratory Protection Program Administrator and seeking assistance in evaluation of respiratory hazards.
- Purchasing respirators based on the recommendations of the Respiratory Protection Program Administrator and making them available for users.
- Enforcing the proper use of respirators.
- Ensuring that respirators are properly cleaned, maintained, and stored.
- Ensuring that respirator users, under their supervision, receive appropriate training, medical evaluation, and initial and annual fit testing; and,
- Identifying changes in jobs or tasks which may require a re-evaluation of respirator use and notifying the Respiratory Protection Program Administrator.

Employee and Student Health Services

Employee and Student Health Services is responsible for:

- Performing initial and periodic medical evaluations and any necessary follow-up examinations of employees, students, and volunteers/visiting scholars to determine their ability to wear a respirator.
- Providing the completed respiratory medical clearance form of the respirator user's ability to wear a respirator to the Respiratory Protection Program Administrator.
- Maintaining records of medical evaluations.

Respirator User (employee, student or volunteers/visiting scholar)

The respirator user is responsible for:

- Completing the OSHA Medical Evaluation Questionnaire (see Appendix B or visit our website at https://campusoperations.temple.edu/sites/campusoperations/files/docs/ehrs/ehrs_files/handbook/documents/OSHARespiratorMedicalEvaluation.pdf) in its entirety and the left-hand side of the Respiratory Medical Clearance form (see Appendix C or visit our website at

https://campusoperations.temple.edu/sites/campusoperations/files/docs/ehrs/ehrs_files/safety/occupational-safety/documents/RespiratoryMedicalClearanceForm.pdf),

and submit them to Employee or Student Health Services.

- Using the respirator in accordance with the manufacturer's instructions and the training received.
- Storing, cleaning, maintaining, and guarding against damage to the respirator.
- Reporting any malfunction of the respirator to his/her employer.
- Inspecting the respirator before each use.
- Promptly reporting to his/her employer or Employee Health Services any symptoms of illness that may be related to respirator usage or exposure to hazardous atmospheres.
- Identifying changes in jobs or tasks which may require re-evaluation of respirator use and notifying the Respiratory Protection Program Administrator.

Environmental Health and Radiation Safety Department

The Environmental Health and Radiation Safety Department is responsible for developing, implementing, and administering the Respiratory Protection Program at Temple University.

The Respiratory Protection Program Administrator is responsible for:

- Evaluating respiratory hazards in the work areas.
- Coordinating medical evaluation and fit testing services for respirator users.
- Providing guidance to the employer for selecting and purchasing approved respirators.
- Assisting with fit testing for respirator users.
- Providing training (including refresher sessions) on the proper use, maintenance, and storage of respirators to all respirator users.
- Maintaining records on respiratory protective equipment assignments, medical clearances, fit testing, and training.
- Evaluating the overall effectiveness of the respirator program.

Section 3: Procedures for Selecting Respirators for Use in the Workplace

Respirator selection requires correctly matching the respirator with the hazard (the degree of hazard) and the user. The respirator selected must be adequate to effectively reduce the exposure of the respirator user under all conditions of use, including reasonably foreseeable emergency situations. Proper respirator selection involves choosing a device that fully protects the user from the respiratory hazards to which he/she may be exposed and permits the user to perform the job with the least amount of physical burden.

The Environmental Health and Radiation Safety Department will identify and evaluate the

respiratory hazard(s) in the workplace. This evaluation will include a reasonable estimate of the respirator user's exposures to the respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. The Environmental Health and Radiation Safety Department will select and provide an appropriate respirator based on the respiratory hazard(s) to which the user is exposed in the workplace, along with user factors that affect respirator performance and reliability. The [2004 NIOSH Respirator Selection Logic](#) will serve as a template for assuring that all of the important elements are considered when selecting a respirator. (This template can be found on page in Appendix A of this document.)

To effectively select the respirator, the Environmental Health and Radiation Safety Department must first assemble the necessary toxicological, safety, and other relevant information for each respiratory hazard, which can include:

1. **Nature of the hazard and the physical and chemical properties of the air contaminant.** The nature of the hazard, whether it is in the form of a gas, dust, organic vapor, fume, mist, oxygen deficiency or any combination of hazards, needs to be considered. The physical and chemical properties of the contaminant that affect respirator selection, and the selection of respirator components such as cartridges and filters must also be considered. Physical properties include such factors as particle size for dusts, and vapor pressure for gases and vapors. Chemical properties of the air contaminant that affect breakthrough times, and the ability of the filter material to remove, adsorb, or absorb the contaminant must also be considered.
2. **Concentrations of contaminants.** Sampling and analysis of the workplace air determines what degree of exposure is occurring, and thus what degree of protection is required. Where such sampling and analysis have been done, the results are to be used as a point of comparison with the occupational exposure level, i.e., to determine how much the concentration must be lowered by the respirator to reduce respirator user's exposure to a safe level.
3. **The relevant permissible exposure limit or other occupational exposure limit.** Respirators selected must be capable of protecting against overexposure by reducing and maintaining exposure to or below the relevant exposure limit. In addition to the OSHA occupational exposure limits, Environmental Health and Radiation Safety will refer to the American Conference of Governmental Industrial Hygienists (ACGIH) recommended Threshold Limit Values (TLV's), and the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL's).
4. **Nature of the work operation or process.** The type of job operation, the equipment or tools that will be used, and any motion or travel the job requires can influence the type of respirator selected.

5. **Time period respirator is worn.** Environmental Health and Radiation Safety will consider the period of time during which the respirator will be used by respirator user during a work shift. Breakthrough times for different chemicals can vary greatly and are dependent on the concentrations of contaminants in the workplace air, patterns of respirator use, and environmental factors including temperature and humidity. A respirator that provides adequate protection for one chemical may be inadequate for another chemical with a different breakthrough time. In addition, individuals wearing respirators for longer periods of time may need respirators that impose the minimum possible physical burden.
6. **Work activities and stress.** The work activities of individuals while wearing respirators are also a factor. Heavy work that is physically draining may affect an employee's capability of wearing certain types of respirators. Temperature and humidity conditions in the workplace may also affect the physical/psychological stress level associated with wearing a respirator, as well as the effectiveness of respirator filters and cartridges. These types of factors must be assessed in selecting the appropriate equipment for a particular work situation.
7. **Fit testing.** Some individuals may be unable to achieve an adequate fit with certain respirator models or a particular type of respirator, such as N95 particulate respirator; an alternative respirator model with an adequate fit or other type of respirator that provides adequate protection will be used. Environmental Health and Radiation Safety will provide a sufficient number of respirator models and sizes from which respirator users can choose an acceptable respirator that fits correctly.
8. **Physical characteristics, functional capabilities, and limitations of respirators.** The last category of information to be considered when selecting respiratory protection is the physical characteristics, functional capabilities, and limitations of the respiratory protection equipment itself. Respirators selected must not impair the user's vision, hearing, communication, and physical movement necessary to perform jobs safely.

Summary of Potential Respiratory Hazards

The list below is not exhaustive but is meant to provide examples of potential various hazards individuals can be exposed to.

Biological Hazard

The National Institute of Allergy and Infectious Diseases, a division of the National Institutes of Health, classifies biological agents in the following ways:

- **Category A** are those organisms/biological agents that pose the highest risk to national security and public health because they:
 - can be easily disseminated or transmitted from person to person;
 - result in high mortality rates and have the potential for major public health impact;
 - might cause public panic and social disruption; and,
 - require special action for public health preparedness.

- **Category B** are the second-highest priority agents/organisms/biological agents that:
 - are moderately easy to disseminate;
 - result in moderate morbidity rates and low mortality rates; and,
 - require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

- **Category C Diseases/Agents** are the third-highest priority agents and include emerging pathogens that could be engineered for mass dissemination in the future because of:
 - Availability;
 - ease of production and dissemination; and,
 - potential for high morbidity and mortality rates and major health impact.

Some biological agents are naturally respiratory hazards that affect humans. Other agents that may not normally be considered to be respiratory hazards to humans may be weaponized, genetically modified, or enhanced with other materials to make them respiratory hazards. For this purpose, a comprehensive list of biological agents has been adopted from the [National Institute of Allergy and Infectious Diseases](#).

Category A Priority Agents

Bacillus anthracis (anthrax)

Clostridium botulinum toxin (botulism)

Yersinia pestis (plague)

Variola major (smallpox) and other related pox viruses

Francisella tularensis (tularemia)

Viral hemorrhagic fevers

- Arenaviruses
- Bunyaviruses
- Flaviviruses (e.g., Dengue)
- Filoviruses (e.g., Ebola and Marburg)

Category B Priority Agents

Burkholderia pseudomallei (melioidosis)

Coxiella burnetii (Q fever)

Brucella species (brucellosis)

Burkholderia mallei (glanders)

Chlamydia psittaci (Psittacosis)

Ricin toxin (*Ricinus communis*)

Epsilon toxin (*Clostridium perfringens*)

Staphylococcus enterotoxin B (SEB)

Typhus fever (*Rickettsia prowazekii*)

Food- and waterborne pathogens

- Bacteria
 - Diarrheagenic *E. coli*
 - Pathogenic Vibrios
 - *Shigella* species
 - Salmonella
 - *Listeria monocytogenes*
 - *Campylobacter jejuni*
 - *Yersinia enterocolitica*

- Viruses
 - Caliciviruses
 - Hepatitis A

- Protozoa
 - *Cryptosporidium parvum*
 - *Cyclospora cayatanensis*
 - *Giardia lamblia*
 - *Entamoeba histolytica*
 - *Toxoplasma gondii*
 - *Naegleria fowleri*
 - *Balamuthia mandrillaris*

- Fungi
 - Microsporidia

Mosquito-borne encephalitis viruses

- West Nile virus (WNV)
- LaCrosse encephalitis (LACV)
- California encephalitis
- Venezuelan equine encephalitis (VEE)
- Eastern equine encephalitis (EEE)
- Western equine encephalitis (WEE)
- Japanese encephalitis virus (JE)
- St. Louis encephalitis virus (SLEV)

Category C Priority Agents

Nipah and Hendra viruses

Additional hantaviruses

Tickborne hemorrhagic fever viruses

- Bunyaviruses
 - Severe Fever with Thrombocytopenia Syndrome virus (SFTSV), Heartland virus
- Flaviviruses
 - Omsk Hemorrhagic Fever virus, Alkhurma virus, Kyasanur Forest virus

Tickborne encephalitis complex flaviviruses

- Tickborne encephalitis viruses
- European subtype
- Far Eastern subtype
- Siberian subtype
- Powassan/Deer Tick virus

Yellow fever virus

Tuberculosis, including drug-resistant TB

Influenza virus

Other Rickettsias

Rabies virus

Prions

Chikungunya virus

Coccidioides spp.

Severe acute respiratory syndrome associated coronavirus such as SARS-CoV, SARA-Cov-2, MERS-CoV, and other highly pathogenic human coronaviruses

Antimicrobial resistance, excluding research on sexually transmitted organisms, unless the resistance is newly emerging*

- Research on mechanisms of antimicrobial resistance
- Studies of the emergence and/or spread of antimicrobial resistance genes within pathogen populations
- Studies of the emergence and/or spread of antimicrobial-resistant pathogens in human populations
- Research on therapeutic approaches that target resistance mechanisms
- Modification of existing antimicrobials to overcome emergent resistance

***Excluded Research (Sexually Transmitted Organisms)** - Bacterial vaginosis, *Chlamydia trachomatis*, cytomegalovirus, *Granuloma inguinale*, *Hemophilus ducreyi*, hepatitis B virus, hepatitis C virus, herpes simplex virus, human immunodeficiency virus, human papillomavirus, *Treponema pallidum*, *Trichomonas vaginalis*

Antimicrobial research, as related to engineered threats and naturally occurring drug-resistant pathogens, focused on development of broad-spectrum antimicrobials

Chemical Hazards

Acetic Acid	Acetone
Acetylene gas	Ammonia
Arsenic	Arsine (SA)
Benzene	Bromobenzylcyanide
Chlorine	Cyanide
Cyanogen Chloride	Ethylene Glycol
Formaldehyde (including formalin and paraformaldehyde)	Hydrofluoric Acid
Hydrochloric acid	Hydrofluoric acid

Mercury	Mustard/Lewisite
Nitrous Oxide	Phenol
Sarin	Sulfuric Acid
Toluene	Xylene

Radiological Hazards

Alpha particles
Beta particles
Gamma

Other Respiratory Hazards

Laboratory animal allergy (LAA) is recognized as an occupational disease, in peer-review articles, which can affect individuals exposed to laboratory animals. Most laboratory animal species have multiple allergen sources (i.e., hair, dander, urine, saliva, and serum), each of which warrants consideration where exposure is concerned. Like many occupational hazards, the intensity (or concentration) of allergen exposure, along with duration and routes of entry, are significant factors in an allergic disease. Occupational exposure to animal allergens occurs predominantly through inhalation of airborne allergens, which makes exposure control largely an exercise in particulate control. There is no clearly established threshold for allergen exposure to support a minimum safe exposure level. Where engineering and administrative controls have proven to be infeasible and/or an individual is sensitized to LAA (based on medical judgement from a Physician or other Licensed Health Care Professional), a NIOSH-certified respiratory protective equipment will be selected, which will include an air purifying respirator with a minimum filter efficiency of 95% for the most penetrating aerosol size (0.3 μm) or a Powered Air-Purifying Respirator (PAPR). (These respirators are defined in detail below.)

Respirator Classifications

Respirators provide protection either by removing contaminants from the air before they are inhaled or by supplying an independent source of respirable air. The respirator must be used in compliance with the conditions of that certification. When selecting a respirator for the hazard(s) in the area, a list of NIOSH-certified respirators and the conditions of the certification will be obtained from [NIOSH's certified equipment list](#).

Environmental Health and Radiation Safety will select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to and correctly fits the user. There are two major classifications of respirators:

- Air purifying respirators (devices that remove contaminants from the air); and,
- Atmosphere-supplying respirators (those devices that provide clean breathing air from an uncontaminated source).

Air Purifying Respirators

These respirators are grouped into three general types: *particulate removing*, *vapor and gas removing*, and *combination*. Elements that remove particulates are called filters; while vapor and gas removing elements are called chemical cartridges. Filters and cartridges are the functional portion of air-purifying respirators, and they can generally be removed and replaced once their effective life has expired (see page 19 of this section). The exception would be filtering facepiece respirators (commonly referred to as "disposable respirators," "dust masks," or "single-use respirators"), which cannot be cleaned, disinfected, or resupplied with an unused filter after use.

1. **Particulate-removing** respirators are designed to reduce inhaled concentrations of nuisance dusts, fumes, mists, toxic dusts, radon daughters, asbestos-containing dusts or fibers, or any combination of these substances, by filtering most of the contaminants from the inhaled air before they enter the breathing zone of the respirator user. They may have single-use or replaceable filters. These respirators may be non-powered or powered air-purifying.
 - a. Non-powered air-purifying particulate respirators are classified into three series, N-, R-, and P. They are classified according to the efficiency level of the filter(s), as tested according to the requirements outlined in 42 CFR §84.170.

Filter classifications, efficiencies, oil resistances and challenge agents specified			
Minimum Efficiency	N Non-oil Aerosols	R Includes oil Aerosols*	P Includes oil Aerosols**
95%	N95	R95	P95
99%	N99	R99	P99
99.97%	N100	R100	P100
*May have a time use restriction on this filter series when oil aerosols are present.			
**Use according to manufacturer's time use restrictions when oil aerosols are present.			

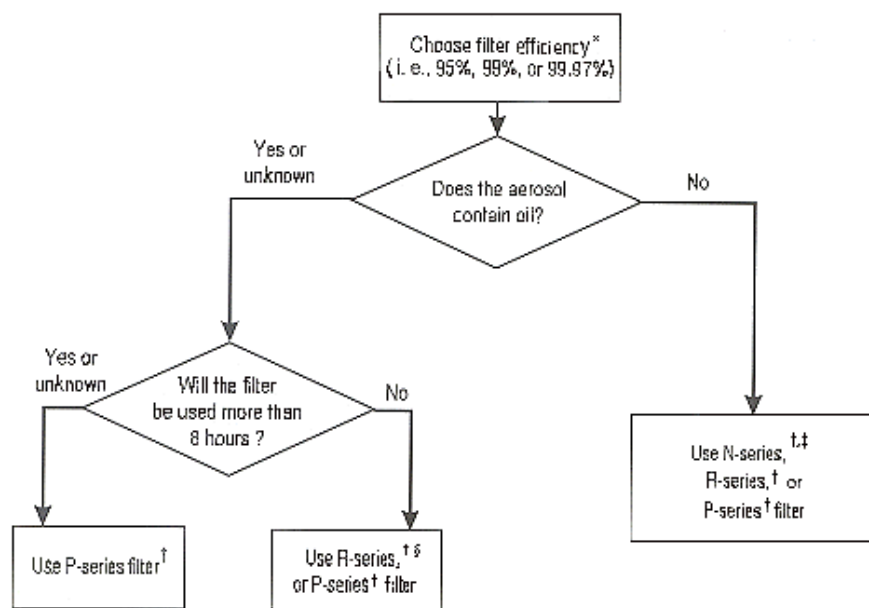
- 1) N-Series particulate respirators are NOT resistant to oil; thereby providing protection against solid and liquid aerosol particulates that do NOT contain oil. Examples of common non-oil based solid particulates include “dust” particles related to metal or wood non-oil-based liquids. The difference between an N95, N99 and N100 respirator is simply the filter’s efficiency level (i.e., N95 = NOT resistant to solids and liquids which contain oil and provides 95% filtering efficiency). The higher the efficiency, the more particulates the respirator will filter out. **Note:** Unless the manufacturer identifies a specified duration of use, for example “single-use only”, the service life of all filters is limited by considerations of hygiene, damage, and breathing resistance. All filters should be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance. Follow the manufacturer’s recommendations for specific information on the model you are using or departmental change-out schedule.

- 2) R-Series particulate respirators are resistant to oil, which means they provide protection against both solid and liquid aerosol particulates that may contain oil. These respirators, however, are only certified for up to 8-hours of service life.

- 3) P-Series particulate respirators are similar to the R-series

particulate respirators, in that they provide protection against both solid and liquid aerosol particulates that may contain oil. The service life of P-Series particulate respirators, however, is substantially longer, with NIOSH recommended disposal after 40 hours or 30 days of use, whichever comes first. This extended service life is contingent on the respirator being undamaged and with no detectable breathing resistances.

Flow Chart for Selecting Particulate Filters



Source: [42 CFR § 84 Respiratory Protective Devices](#)

- b. A powered air-purifying respirator (PAPR) uses a blower to force the ambient atmosphere through air purifying elements to the inlet covering.
2. **Vapor- and gas-removing** respirators are designed with sorbent elements (cartridges) that adsorb and/or absorb the vapors or gases from the contaminated air before they can enter the breathing zone of the user. An example of this type of respirator would be a full facepiece respirator.
3. **Combination** respirators are designed to be used in atmospheres that contain hazards of both particulates and gases and use combination cartridges to reduce exposure to these hazards.

All filters and cartridges used in the workplace must be labeled and color coded with the NIOSH approval label. The label must not to be removed and must remain legible.

Here are the different respirators the Environmental Health and Radiation Safety Department approved to be worn throughout the University.

- N95 particulate respirators
 - 3M™ 1860 (large) and 1860S (small)
 - 3M™ Aura™ 9210+
 - Moldex 2200 (medium/large) and 2201 (small)
 - Kimberly Clark Tecnol PFR95 in small and regular

- Powered air-purifying respirator (PAPR)
 - 3M™ Versaflo TR-300-HKS (small head cover kit) or HKL (large head cover kit).
 - 3M Versaflo TR-600 (with S-807 head cover and S-950 head suspension; designated for the Environmental Health and Radiation Safety Department)

- Full-face air purifying respirator (in various sizes)
 - MSA Ultra Elite or Ultra-Twin
 - 3M™ FX 400 series
 - Moldex model 9000
 - Drager X-plore 6300

Respirators with air-purifying sorbent elements (e.g., cartridges) must be used with caution and with recognition of the wide variability of service lives under differing use conditions.

Factors known to affect the service lives of sorbent elements include, but are not limited to:

- the make and model of sorbent element(s);
- airborne concentrations of contaminant(s); and
- relative humidity through each sorbent element.

Provided that the respirator is equipped with an End-of Service-Life Indicator (ESLI) certified by NIOSH for the contaminant. If, on the other hand, the respirator is not equipped with an ESLI, the employer must implement a change schedule for cartridges and/or filters that is based on objective information or data that will ensure that cartridges and filters are changed before the end of their service life.

Note: Environmental Health and Radiation Safety will provide guidance on the

determining process and disseminate this information during the fit-testing and training session.

Atmosphere-Supplying Respirators

These respirators provide air from a source independent of the surrounding atmosphere instead of removing contaminants from the atmosphere. These respirators are classified by the method that is used to supply air and the way in which the air supply is regulated, which include:

1. Self-contained breathing apparatus that contains air or oxygen in a tank and carried on the respirator's back (similar to SCUBA gear);
2. Supplied-air respirator that contains compressed air from a stationary source supplied through a high-pressure hose connected to the respirator); and,
3. Combination self-contained and supplied-air respirators.

These respirators are used in atmospheres that pose an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. **Note:** Environmental Health and Radiation Safety will contact external support (e.g., Philadelphia Hazmat or contracted Waste Vendor) to enter these atmospheres wearing atmosphere-supplying respirators. The external support will be required to follow the requirement elements in 29 CFR §1910.134(i).

Section 4: Medical Evaluations for Respirator Users

Using a respirator may place a physiological burden on an individual that varies with:

- the type of respirator worn;
- the job and workplace conditions in which the respirator is used; and,
- the medical status of the employee.

A medical evaluation will be performed by a Physician or other Licensed Health Care Professional (PLHCP) from Employee Health Services to determine the employee's ability to use a respirator before he/she (or volunteers/visiting scholars) is fit tested or required to use the respirator in the workplace.

Note: Students who receive payment for Temple University and tasks require the use of respirator are deemed employees. Students who do not receive payment from Temple

University and tasks require the use of respirator will be medically cleared by Student Health Services.

The PLHCP will perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire. The medical evaluation questionnaire is described in [29 CFR §1910.134 Appendix C](#). Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination. A “yes” answer to any of the questions numbered 1-8 in Section 2 of Part A requires a follow-up medical examination.

The medical questionnaire and examinations must be administered confidentially during the respirator user’s normal working hours or at a time and place convenient for him/her. The medical questionnaire must be administered in a manner that ensures that the respirator user understands its contents. The employer must provide the respirator user with an opportunity to discuss the questionnaire and examination results with the PLHCP.

The following information must be provided to the PLHCP before he/she makes a recommendation concerning an individual’s ability to use a respirator:

- the type and weight of the respirator to be used by the individual;
- the duration and frequency of respirator use (including use for rescue and escape);
- the expected physical work effort;
- additional protective clothing and equipment to be worn; and,
- temperature and humidity extremes that may be encountered.

The employer must ensure that a follow-up medical examination is provided for an individual who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of OSHA Respirator Medical Evaluation Questionnaire (Mandatory), Appendix C to 29 CFR §1910.134 or whose initial medical examination demonstrates the need for a follow-up medical examination. The follow-up medical examination must include any medical tests, consultation, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

Note: The Environmental Health and Radiation Safety Department created a reader friendly version of the [OSHA Respirator Medical Evaluation Questionnaire](#), which contains information from Sections 1 and 2, Part A of 29 CFR §1910.134 Appendix C (and can be found in Appendix B of this document). Questions in Part B of Appendix C is not mandatory but may be added at the discretion of the PLHCP.

Subject to 29 CFR §1910.134(m)(1) and 1910.1020(d)(1)(ii), the medical evaluation for each employee must be preserved and maintained for at least the duration of employment plus 30 years. The medical evaluation for an employee who worked less than one year is exempt from

this requirement providing that the medical evaluation is provided to the employee upon termination of employment.

Medical Determination

In determining an individual's ability to use a respirator, the PLHCP will provide Environmental Health and Radiation Safety with a completed [Respiratory Medical Clearance Form](#) regarding the individual's ability to use the respirator. The form (which also can be found in Appendix C of this document) must provide at least the following information:

- Any limitations on respirator use related to the medical condition of the individual, or to the workplace conditions in which the respirator will be used, including whether he/she is medically able to use the respirator.
- The need, if any, for follow-up medical evaluations.
- A statement that the PLHCP has provided the employee with a copy of the form.

This information will help the Environmental Health and Radiation Safety Department proceed with fit-testing and training the respirator user on the determined respirator.

If the respirator is a non-powered air-purifying particulate respirator (e.g., N95 particulate respirator) and the PLHCP finds a medical condition that may place the individual's health at risk if the respirator is used, the employer must provide a Powered Air-Purifying Respirator (PAPR) if the PLHCP's medical evaluation finds that he/she can use such a respirator. If a subsequent medical evaluation finds that the respirator user is medically able to use a non-powered air-purifying particulate respirator, the employer is no longer required to provide a PAPR.

Additional Medical Evaluations

At a minimum, the employer must provide an additional medical evaluation that comply with the requirements of 29 CFR §1910.134 if:

- The respirator user reports medical signs or symptoms that are related to the ability to use a respirator.
- A PLHCP, supervisor, or the Respirator Program Administrator informs the employer that the respirator user needs to be re-evaluated.
- Information from the respiratory protection program, including observations made during fit-testing and program evaluation, indicates a need for the respirator user to be re-evaluated.
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing,

and temperature) that may result in a substantial increase in the physiological burden placed on the respirator user.

Section 5: Fit Testing Procedures for Respirators

Before an individual - employee, student, or volunteers/visiting scholar – uses any respirator, he/she must be fit tested with the same make, model, style, and size of respirator that will be used in the workplace.

The employer must ensure that the respirator user using a respirator is fit tested (or trained):

- prior to initial use of the respirator;
- whenever a different respirator facepiece (size, style, model, or make) is used; and,
- at least annually thereafter.

Method

Prior to the actual fit test, the Environmental Health and Radiation Safety Department will provide information on the appropriate respirator to wear for the hazardous environment. When the respirator is obtained, the respirator user must contact the Environmental Health and Radiation Safety Department to schedule a time to be fit-tested and trained on the selected respirator.

Types of Fit Testing

Fit testing may either be *qualitative (QLFT)* or *quantitative (QNFT)* and will be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA accepted QLFT and QNFT protocols are listed in [Appendix A of 29 CFR §1910.134](#).

Prior to the commencement of the fit test, the respirator user will be given a description of the fit test and a description of the exercises that he/she will be performing during fit testing. The respirator to be tested will be worn for at least five minutes before the start of the fit test.

Qualitative fit testing (QLFT). Qualitative fit testing involves the introduction of an aerosol test agent into an area around the head of the respirator user. A determination is then made as to whether the wearer can detect the presence of the test agent through means such as odor, taste, or nasal irritation. If the presence of the test agent is detected inside the respirator, the fit is inadequate. There are four qualitative fit test protocols approved in OSHA's standard. However, the Environmental Health and Radiation Safety Department primarily uses the Bitrex™ (Denatonium Benzoate)

Solution Qualitative Fit Test Protocol. The Saccharin Solution Aerosol Protocol will be used as an alternative on a case-by-case basis.

Quantitative fit testing (QNFT). Quantitative fit-testing employs instrumentation to measure the amount of leakage into the respirator. There are four quantitative fit test protocols approved in OSHA's standard. The Environmental Health and Radiation Safety Department uses the ambient aerosol condensation nuclei counter (CNC; Portacount™) protocol and modified version; it quantitatively fit tests respirators with the use of a probe. Note: The probed respirator is only used for quantitative fit tests and required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. A probed respirator has a special sampling device, installed on the respirator that allows the probe to sample the air from inside the respirator. A minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure must be explained to the respirator user prior to the conduct of the screening test.

The Environmental Health and Radiation Safety Department will conduct an additional fit test whenever the respirator user reports, or the employer makes visual observations of, changes in his/her condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight (29 CFR §1910.134[f][3]).

Fit Test Exercises

The following test exercises will be performed for all fit testing methods described in the OSHA Respiratory Protection standard in the Environmental Health and Radiation Safety Department:

- Normal breathing in a normal standing position, without talking;
- Deep breathing in a normal standing position, breathing slowly and deeply, taking precaution not to hyperventilate;
- Turning the head slowly from side to side, while standing in place, with the respirator user holding his/her head momentarily at each extreme so that he/she can inhale at each side;
- Moving the head up and down slowly, while standing in place, inhaling in the up position when looking toward the ceiling;
- Talking out loud slowly, reading from a prepared text such as the Rainbow Passage, counting backward from 100, or reciting 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.

- Grimacing by smiling or frowning (only for QNFT testing);
- Bending at the waist as if to touch toes (jogging in place can be done when the fit test enclosure doesn't permit bending at the waist); and
- Normal breathing (as described above).

Each test exercise must be performed for one minute, except for the grimace exercise which must be performed for 15 seconds. The respirator must not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

Note: The modified Modified ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol uses the following exercises:

- Bending Over for a 20 second ambient sample, followed by a 30 second mask sample;
- Jogging-in-Place for a 30 second mask sample;
- Head Side-to-Side for a 30 second mask sample; and,
- Head Up-and-Down for a 30 second mask sample followed by a 9 second ambient sample.

The Environmental Health and Radiation Safety Department will coordinate a time for the respirator user to come to their office and perform the exercises in their office. He/she will also be asked to refrain from eating, drinking, and/or smoking 15 minutes prior to the commencement of the fit-testing session, and to bring any applicable safety equipment that may be worn during actual respirator use to session to determine if it could interfere with the respirator fit. If the respirator user exhibits breathing difficulty during the fit test, he/she will be referred to PLHCP to determine whether the respirator user can wear a respirator while performing his or her duties.

Retesting

If the respirator user finds the fit of the respirator unacceptable during the fit-testing session, he/she is given a reasonable opportunity to select a different respirator and to be retested. In

addition, retesting is required whenever the respirator user reports, or the employer, PLHCP, supervisor, or program administrator observe changes in his/her physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes (e.g., wearing new dentures), cosmetic surgery, or an obvious change in body weight.

Section 6: Procedures for Proper Use of Respirators

The selection of a specific respirator will be made by the Environmental Health and Radiation Safety Department who are knowledgeable about the limitations associated with each class of respirators and familiar with the actual workplace environment, including the job task(s) to be performed.

Once the respirator is properly selected and fitted by the Environmental Health and Radiation Safety Department, it is necessary for the respirator user to ensure that the respirator is used properly in the workplace. The following conditions may compromise the effective use of the respirator and jeopardize protection:

- facepiece seal leakage;
- removing the respirator at the wrong time in hazardous atmosphere(s);
- not properly performing user seal checks; or,
- not replacing defective parts from the manufacture.

In these circumstances, there is the danger that respirator user may have a false sense of security in feeling that they are protected when they are not. The Environmental Health and Radiation Safety Department will cover the aforementioned factors that may compromise the effective use of the respirator during the fit-testing session, along with the following:

- the proper way to don, wear, and doff PPE without contaminating oneself or introducing cross contamination to the workplace;
- how to recognize the respirator's limitation(s); and,
- how to properly inspect, store, maintain, and decontaminate the respirator.

The employer must also be aware of the conditions in the work areas where respirator users are using respirators. Employers are required to routinely evaluate workplace conditions, the degree of respirator user exposure, and physical stress so that they can provide additional or different respiratory protection when necessary. By observing respirator use under actual workplace conditions, employers can note problems such as changes in the fit of a respirator due to the use of other protective equipment, or conditions leading to skin irritation.

Respirator Use Under Special Conditions

Respirator selection are based primarily on the physical, chemical, and toxicological properties of the contaminant and on the limitations of each class of respirators, including filtration efficiency, air supply capability, and face seal characteristics and leakage. The Environmental Health and Radiation Safety Department will use the [NIOSH Decision Logic for Respirator Selection](#) (found in Appendix A of this document), as an assessment tool for respirator selection. Moreover, the Environmental Health and Radiation Safety Department will ensure that the respirator is approved by the National Institute for Occupational Safety and Health (NIOSH), using the National Personal Protective Technology Laboratory [certified equipment list](#).

Typically, respirator users are not exposed to a single unvarying concentration of a hazardous substance; rather individual exposures may vary throughout a work shift and between days. The highest anticipated concentration must, therefore, be considered in the respirator selection process. Respirator users must be aware of the variability in human responses to the warning properties of hazardous substances and must promptly report it to his/her employer or the Respiratory Protection Program Administrator.

- **Seal of Air-purifying Respirators.** The employer must not permit an N95 particulate or full-facepiece respirator to be worn by respirator user who have conditions that would compromise the facepiece-to-face seal. Examples of these conditions include facial hair (e.g., beard stubble, sideburns, or beard) or hair that interferes with the facepiece seal or valve function, absence of normally worn dentures, facial deformities (e.g., scars, deep skin creases, prominent cheekbones), or the use of jewelry or headgear that projects under the facepiece seal.
- **User Seal Check.** A user seal check (formerly known as a fit check) must be performed every time an air-purifying respirator is put on or adjusted to ensure proper seating of the respirator to the face. The Environmental Health and Radiation Safety Department will cover the user seal check for the positive and/or negative pressure checks described in [Appendix B-1 of 29 CFR §1910.134](#) or the manufacturer's recommended procedures (when equally protective). If the respirator user fails the user seal check test, another facepiece will be selected.
- **Corrective Glasses or Goggles.** Corrective glasses or goggles, or other personal protective equipment, must be worn in such a way that they do not interfere with the seal of the facepiece to the face. Since eyeglasses or goggles may interfere with the seal of half-facepiece respirators, the Environmental Health and Radiation Safety Department will recommend that a full-facepiece respirator be worn where either corrective glasses or eye protection is required. Special corrective lenses

can be mounted inside full-face respirators and are available from all manufacturers of full-face piece respirators.

- **Contact Lenses.** Several factors may restrict or even prohibit the use of contact lenses while wearing any type of respiratory device. This is especially true of atmosphere-supplying respirators. With full-facepieces, incoming air directed toward the eye can cause discomfort from dirt, lint, or other debris lodging between the contact lens and the pupil.

Note: Environmental Health and Radiation Safety will use external support who will use atmosphere-supplying respirators. Hence this subsection will be applicable for the external support who are required to follow the requirement elements in 29 CFR §1910.134(i).

- **In Low and High Temperatures.** Low temperatures may fog respirator lenses. Hence the Environmental Health and Radiation Safety Department will recommend a nose cup for full-face piece respirators (which directs the warm, moist exhaled air through the exhalation valve without it touching the nose) to provide satisfactory vision at as low as -30°F.

A respirator user working in high temperature air is under physiological stress. Wearing a respirator causes additional stress which should be minimized by using a light-weight respirator with low breathing resistance. Respirator users must be aware of the signs and symptoms of heat stress, including heat cramps, heat exhaustion, and heat stroke. Heat stroke is a true medical emergency and should not be ignored.

- **Physiological Response to Respirator Use.** Wearing any respirator, alone or in conjunction with other types of protective equipment, will impose some physiological stress on the wearer. Weight of the equipment, for example, increases the energy requirement for a given task.

Use of respirators in conjunction with protective clothing can greatly affect the human response and endurance, especially in hot environments. Normally, in hot environments or during heavy work, the body relies a great deal on heat loss through the evaporation of sweat. With impermeable clothing, the heat loss by water evaporation is not possible. Users must be aware of the signs and symptoms of heat stress, including heat cramps, heat exhaustion, and heat stroke. Heat stroke is a true medical emergency and should not be ignored. Hence, the Environmental Health and Radiation Safety Department will use this information in selecting the appropriate respirator to reduce the health load to the respirator

user.

To reduce the incidence of heat stress, the Environmental Health and Radiation Safety Department recommend methods, such as:

- adjusting the work/rest schedules;
 - using automated procedures and/or mechanical assistance where possible;
 - minimize the work intensity; and,
 - periodic fluid/water replacement breaks and consider cooling garments.
- **Chemical Contaminant Migration:** The employer and user should be aware that some contaminants tend to migrate through cartridge sorbent material during periods of storage or nonuse. This is characteristic of the contaminant-carbon bed interaction for organic chemicals with boiling points below 149°F (65°C) and would predictably shorten breakthrough times. In cases where respirators are used for multiple days, this could present an additional exposure to the respirator user. Where contaminant migration is possible, respirator cartridges without ESLI must be changed after every work shift where exposure occurs.

Section 7: Procedures and Schedules for Cleaning, Disinfecting, Storing, Inspecting, Repairing, Discarding, and Otherwise Maintaining Respirators

The employer is required to provide an environment that will allow cleaning and disinfecting, storage, inspection, and repair of respirators used by respirator user.

Cleaning and Disinfecting

The employer must provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer must ensure that respirators are cleaned and disinfected using the procedures referred to in 29 CFR §1910.134(h) and included in this section for tight-fitting full-facepiece respirators. Procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness, may be substituted.

Note: The Environmental Health and Radiation Safety Department will provide guidance to the user on the appropriate cleaning and disinfecting methods for the respirator either during the fit-testing session or through other means of correspondence (e.g., email).

The following steps are to be followed for a tight-fitting full-facepiece respirator:

1. Remove filters or cartridges. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm (110°F [43°C] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff-bristle (not wire) brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm (110°F [43°C] maximum), preferably running water. Drain.
4. When the cleaner used does not contain a disinfecting agent, respirator components must be immersed for two minutes in one of the following:
 - a. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 110°F (43°C).
 - b. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodine/100 cc of 45% alcohol) to one liter of water at 110°F (43°C).
 - c. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
5. Rinse components thoroughly in clean, warm (110°F [43°C] maximum) preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration or rubber or corrosion of metal parts if not completely removed.
6. Components must be hand-dried with a clean, lint-free cloth or air-dried.
7. Reassemble facepiece, replacing filters and cartridges where necessary.
8. Test the respirator to ensure that all components work properly.

The respirators must be cleaned and disinfected at the following intervals:

- issued for the exclusive use of a respirator user must be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;
- issued to more than one user must be cleaned and disinfected before being worn by different individuals;
- maintained for emergency use must be cleaned and disinfected after each use; and/or,
- used in fit testing and training must be cleaned and disinfected after each use.

Storing

The employer must ensure that respirators are stored as follows:

- All respirators must be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they must be packed and stored to prevent deformation of the facepiece and exhalation valve;
- Emergency respirators must be kept accessible to the work area;
- Emergency respirators must be stored in compartments, covers, or bags that are clearly marked as containing emergency respirators; and,
- Respirators must be stored in accordance with any applicable manufacturer's instructions.

Inspecting

All respirators used in non-emergency situations must be inspected before each use and during cleaning.

Note: The Environmental Health and Radiation Safety Department will provide documentation to the user on how to inspect and store the respirator either during the fit-testing session or through other means of correspondence (e.g., email). An example can be found found in Appendix E.

The respirator inspections should include a check of:

- Respirator function;
- Tightness of connections;
- Condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges and/or filters; and/or,
- Elastomeric parts for pliability and signs of deterioration.

Respirators designated for use in an emergency are to be inspected at least monthly and in accordance with the manufacturer's instructions and checked for proper function before and after each use. These respirators must be certified by documenting the date that the inspection was performed, the name or signature of the inspector, the findings of the inspection, any required remedial action, and a serial number or other means of identifying the inspected respirator. An example of the inspection form the Environmental Health and Radiation Safety Department uses to inspect their respirators can be found in Appendix D of this document. All inspection forms are filed internal and electronic.

Note: The Environmental Health and Safety Department uses the 3M TR-600 Powered Air Purifying Respirator (PAPR) when responding to Level C emergencies. The PAPR systems and battery packs are inspected monthly by designated staff. Staff are issued their own hood assembly and instructed (outlined in an internal Standard Operating Procedure) to perform an inspection prior to connecting it to the PAPR system for emergencies.

Repairing, Discarding, and Otherwise Maintaining Respirators

The employer must ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

- Repairs or adjustments to respirators are to be made only by people appropriately trained to perform such operations and must use only the respirator manufacturer's NIOSH-approved parts designed for the respirator.
- Repairs must be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed.

Service Life Information

A cartridge's useful service life is how long it provides adequate protection from harmful chemicals in the air. The service life of a cartridge depends upon many factors, including:

- Environmental conditions to include relative humidity through each sorbent element;
- Breathing rate;
- Cartridge filtering capacity;
- The make and model of sorbent material; and,
- The amount of contaminants in the air.

Respirators with air-purifying sorbent elements must be used with caution and with recognition of the wide variability of service lives under differing use conditions.

Reliance on odor thresholds and other warning properties will not be permitted as the primary basis for determining the service life of gas and vapor cartridges. Some cartridges are equipped with an End-of-Service-Life Indicator (ESLI). If there is not an ESLI on the cartridges, the Environmental Health and Radiation Safety Department will take a conservative approach and recommend that cartridges and filters be changed when:

- the cartridge and/or filter has been used in a hazardous environment by referring to manufacturer's recommendations for length of service in specific hazardous

- environments;
- the cartridge and/or filter becomes wet;
- the respirator user notices increased resistance;
- the respirator user detects an odor or taste while using the cartridge; or,
- the cartridge and/or filter reaches the manufacturer's expiration date on the cartridge and/or filter.

Section 8: Training on the Proper Use, Limitations, and Maintenance of Respirators

Training is an important part of the respiratory protection program and is essential for correct respirator use. It must be conducted in a manner that is comprehensive, understandable, and take place prior to requiring the respirator user to use a respirator in the workplace and recur at least annually or more often if necessary.

The Environmental Health and Radiation Safety Department will assist, under the employer's supervision, with ensuring that individuals who seek respiratory protection receives training on the proper use of the respirator, including donning and doffing, any limitations in its use, and maintenance. Responsibility for overseeing the implementation of the Respiratory Protection Program for individuals requiring respiratory protection rests upon the employer.

The Environmental Health and Radiation Safety Department will ensure that each respirator user can demonstrate knowledge of at least the following during the fit-testing session:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- Procedures for user seal check;
- What the limitations and capabilities of the respirator are;
- How to use the respirator effectively in emergency situations (if applicable), including situations in which the respirator malfunctions;
- How to inspect, don and doff, use and check the seals of the respirator;
- What the procedures are for maintenance and storage of the respirator (if applicable);
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and,
- The general requirements of 29 CFR §1910.134.

Retraining will be administered annually, and when the following situations occur:

- Changes in the workplace or the type of respirator render previous training obsolete;
- Inadequacies in the respirator user's knowledge or use of the respirator indicate that he/she has not retained the requisite understanding or skill; or,

- Any other situation arises in which retraining appears necessary to ensure safe respirator use.

Respirator users are informed on the respirator's limitations and maintenance (if applicable) either by a form or email correspondences. All form templates (including email correspondence) for the respirators worn at Temple University can be found at the Environmental Health and Radiation Safety Department on the S:drive.

The employer or respirator user must notify the Respiratory Protection Program Administrator of the above mentioned. Additionally, the Environmental Health and Safety Department created a fact sheet for both the employer and respirator to serve as their reminder for the respective responsibilities.

Section 9: Training in the Respiratory Hazards to Which They Are Potentially Exposed During Emergency Situations

An analysis of the hazards to which individuals are potentially exposed during routine and emergency situations is contained in Section 1: Procedures for Selecting Respirators for Use in the Workplace.

Employees, who are First Responders or First Receivers, must employ the Recognize, Avoid, Isolate, and Notify (R.A.I.N.) process with respect to respiratory hazards. Training on these procedures will be comprehensive, understandable, and conducted annually or more frequently if necessary (see section 8). Indicators that the employee may require additional training may include that the employee's competency in this function is questioned by the employee him/herself or the employee's supervisor, or if work conditions change in a manner that is inconsistent with the R.A.I.N. procedures.

R: Recognize

- Recognize respiratory hazards by observing signs and symptoms of victims such as Salivation, Lacrimation, Urination, Defecation, Gastroenteritis, Emesis, Miosis (SLUDGEM), redness or blistering of the skin, and mass casualties or mass fatalities. Other indicators may include injury and/or illness in animals and/or birds.
- Recognize potential respiratory hazards by observing package labels, vehicle or container placards, leaking or damaged containers, and/or the presence of containers that may be used as dissemination devices.
- Recognize potential respiratory hazards by observing threat levels, verbal or written

threats, and abnormal public behavior.

A: Avoid

- Avoid unprotected exposure in areas and situations with known or suspected respiratory hazard releases.
- Don appropriate respiratory protection in known or suspected respiratory hazard releases.
- Don other appropriate PPE as indicated.

I: Isolate

- Assume a safe distance from the respiratory hazard(s). Ensure a secure perimeter, as feasible, to ensure the responder's safety, as well as public safety.
- Establish control zones—hot, warm, and cold zones.
- Perform self-decontamination procedures to remove contaminants.

N: Notify

- Notify immediate supervisor and appropriate chain of communication for other responding units of known or suspected respiratory hazard release.
- If you have been injured or exposed, an injury report form may be indicated.

Section 10: Individual Use of Respirators Not Required by Temple University

Where respirator use is not required, the employer may provide respirators at the request of individuals or permit individuals to use their own respirators if it is determined that such respirator use will not in itself create a hazard.

The employer must contact the Environmental Health and Radiation Safety Department to identify and evaluate the respiratory hazard(s) in the workplace, using the [2004 NIOSH Respirator Selection Logic](#) as a template. If it is determined that voluntary respirator use is permissible, elements outlined in this respiratory protection program must be implemented to ensure that any individual using a respirator voluntarily is provided the same service and oversight as an individual who is required to wear a respirator. They include the following:

- Get a medical evaluation done to determine if they are physically able to wear a

- respirator (see section 4);
- Choose a certified respirator to protect against the contaminant of concern. **Note:** The National Institute for Occupational Safety and Health (NIOSH) certifies respirators, and the Environmental Health and Radiation Safety Department will provide assistance with the selection process (see section 3);
 - Get fit-tested by the Environmental Health and Radiation Safety Department (see section 5); and,
 - The employer must ensure that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user.

Section 11: Procedures for Regularly Evaluating the Effectiveness of the Program

The employer must conduct evaluations of the workplace as necessary to ensure that the provisions of the current written respiratory protection program are effectively implemented and that it continues to be effective (Respiratory Protection, 29 CFR §1910.134[l]). Upon completion of the fit-test and training, the Respiratory Protection Administrator provides a document to the employee -- listing the names of those who are enrolled in the Respiratory Protection program and respirator, and their responsibilities (as the employer).

The Environmental Health and Radiation Safety Department will consult with respirator user at least annually to assess his/her views of the program effectiveness and to identify any problems. Any problems identified during this assessment must be corrected. Factors to be assessed include, but are not limited to:

- Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
- Appropriate respirator selection for the hazards to which the employee is exposed;
- Proper respirator use under the workplace conditions the employee encounters; and,
- Proper respirator maintenance.

Appendix A: Assessment Tool for NIOSH Decision Logic for Respirator Selection

This section comes directly from the [2004 NIOSH Respirator Selection Logic](#) (p. 2 and 5-10). To use this selection logic, the Environmental Health and Radiation Safety Department will first assemble the necessary toxicological, safety, and other relevant information for each respiratory hazard, including the following:

- General use conditions, including determination of contaminant(s);
- Physical, chemical, and toxicological properties of the contaminant(s);
- NIOSH recommended exposure limit (REL), OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), State-OSHA exposure limit, American Industrial Hygiene Association (AIHA) Workplace Environmental Exposure Limit (WEEL), or other applicable occupational exposure limit;
- Expected concentration of each respiratory hazard;
- Immediately dangerous to life or health (IDLH) concentration;
- Oxygen concentration or expected oxygen concentration;
- Eye irritation potential; and
- Environmental factors, such as presence of oil aerosols.

Step 1. Is the respirator intended for use during firefighting?

If yes, only a full-facepiece, pressure-demand, self-contained breathing apparatus (SCBA) meeting the requirement of the NFPA 1981, Standard on Open-circuit Self-contained Breathing Apparatus for Fire and Emergency Services (2002 edition) is required. **Note:** The Environmental Health and Radiation Safety Department will contact external support (e.g., Philadelphia Fire Department) for firefighting events. The external support will be required to follow the requirement elements in 29 CFR §1910.134(i).

If no, proceed to Step 2.

Step 2. Is the respirator intended for use in an oxygen-deficient atmosphere, i.e., less than 19.5% oxygen?

If yes, any type of SCBA other than escape only, or supplied-air respirator (SAR) with an auxiliary SCBA is required. Auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted. **If yes, and contaminants are also**

present, proceed to Step 3 to determine if the hazard requires the SCBA or SAR/SCBA to meet a specific APF level.

If no, proceed to Step 3.

Step 3. Is the respirator intended for entry into unknown or IDLH atmospheres (e.g., an emergency)?

If yes, one of two types of respirators are required: a pressure demand SCBA with a full facepiece or a pressure-demand SAR with a full facepiece in combination with an auxiliary pressure-demand SCBA. Auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted.

If no, proceed to Step 4.

Step 4. Is the exposure concentration of the contaminants, as determined by acceptable industrial hygiene methods, less than the NIOSH REL or other applicable exposure limit?

If yes, a respirator is not required for routine work. For escape respirators, determine the potential for generation of a hazardous condition caused by an accident, spill or equipment failure. See Section IV. Page 17, for a discussion and selection of escape respirators. Proceed to Step 6.

If no, proceed to Step 5.

Step 5. Are conditions such that an individual who is required to wear a respirator can escape from the work area and not suffer loss of life or immediate or delayed irreversible health effects if the respirator fails, i.e., are the conditions not immediately dangerous to life or health (IDLH)? IDLH values for certain compounds can be found in the NIOSH Pocket Guide for Chemical Hazards. This document can be accessed at <http://www.cdc.gov/niosh/npg/npg.html>.

If yes, conditions are not considered to be IDLH. Proceed to Step 6.

If no, conditions are considered to be IDLH. Two types of respirators are recommended: a pressure-demand, full-facepiece SCBA or a pressure demand, full-facepiece SAR in combination with an auxiliary pressure demand, full-facepiece SCBA. The auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted. An auxiliary unit means that the SAR unit includes a separate air bottle to provide a reserve source of air should the airline become damaged. The auxiliary unit shares the same respirator and regulator and enables the SAR to function as an SCBA if

needed.

Step 6. Is the contaminant an eye irritant, or can the contaminant cause eye damage at the workplace concentration? Information on eye irritation is included in the International Chemical Safety Cards which can be accessed at <https://www.cdc.gov/niosh/ipcs/default.html>.

If yes, a respirator equipped with a full facepiece, helmet, or hood is recommended. Proceed to Step 7.

If no, a half-face or quarter-face respirator may still be an option, depending on the exposure concentration. Proceed to Step 7.

Step 7. Determine the maximum hazard ratio (HR) by the following:

Divide the time-weighted average (TWA) exposure concentration for the contaminant determined in Step 4 by the NIOSH REL or other applicable exposure limit. If the exposure limit is an 8 hour limit the TWA used must be on 8-hour average. If the exposure limit is based on 10 hours, use a 10-hour TWA.

If the contaminant has a ceiling limit, divide the maximum exposure concentration for the contaminant determined in Step 4 by the ceiling limit. If the contaminant has a short-term exposure limit (STEL), divide the maximum 15 min TWA exposure concentration for the contaminant determined in Step 4 by the STEL.

For escape respirators, determine the potential for generation of a hazardous condition caused by an accident or equipment failure.

If a potentially hazardous condition could occur or a hazard ratio greater than 1 has been calculated, proceed to Step 8.

Step 8. If the physical state of the contaminant is:

- a particulate (solid or liquid aerosol) during periods of respirator use, proceed to Step 9;
- a gas or vapor, proceed to Step 10;
- a combination of gas or vapor and particulate, proceed to Step 11.

Step 9. Particulate Respirators

Step 9.1: Is the particulate respirator intended only for escape purposes?

If yes, see Section 4 of this program, for a discussion and selection of escape respirators.

If no, the particulate respirator is intended for use during normal work activities. Proceed to Step 9.2.

Step 9.2: Filter series (N, R or P) that will provide protection against exposure to the particulate in question is recommended.

The selection of N-, R-, and P-series filters depends on the presence or absence of oil particles, as follows:

- If no oil particles are present in the work environment, use a filter of any series (i.e., N-, R-, or P-series).
- If oil particles (e.g., lubricants, cutting fluids, glycerine, etc.) are present, use an R- or P-series filter. **Note:** N-series filters cannot be used if oil particles are present.
- If oil particles are present and the filter is to be used for more than one work shift, use only a P-series filter.

Note: To help you remember the filter series, use the following guide:
N for Not resistant to oil
R for Resistant to oil
P for oil Proof

Selection of filter efficiency (i.e., 95%, 99%, or 99.97%) depends on how much filter leakage can be accepted. Higher filter efficiency means lower filter leakage.

Step 9.3: Respirators that have not been eliminated from [Table 1](#) (Assigned Protection Factors [APF] of 29 CFR §1910.134) by the previous steps and that have APFs equal to, or greater than, the maximum hazard ratio determined in Step 7 are recommended.

Note, however, that the maximum use concentration (MUC) is the maximum atmospheric concentration of a hazardous substance from which a respirator user can be expected to be protected by a class of respirator and is determined by the lesser of:

- APF X exposure limit
- The respirator manufacturer's MUC for a hazardous substance
- (if any) 1 If the respirator is intended for use in an oxygen-deficient atmosphere, only SCBA or SAR with an auxiliary SCBA, can be selected from the Table.
- The IDLH, unless the respirator is a pressure-demand, full-facepiece SCBA or combination pressure-demand SAR with a full facepiece in combination with an auxiliary pressure-demand SCBA.

For multi-component mixtures the MUC can be calculated by:

$$C_1/MUC_1 + C_2/MUC_2 + \dots C_n/MUC_n = 1$$

Step 10. Gas/Vapor Respirators

Step 10.1: Is the gas/vapor respirator intended only for escape?

- If yes, refer to escape respirators Section IV.
- If no, the gas/vapor respirator is intended for use during normal work activities. Proceed to Step 10.2.

Step 10.2: An air-purifying chemical cartridge respirator is recommended that has a sorbent suitable for the chemical properties of the anticipated gas/vapor contaminant(s) and for the anticipated exposure levels. Information on cartridges approved for use for classes of chemicals or for specific gases or vapors can be found in the [NIOSH Certified Equipment List](#). Proceed to Step 10.3.

Step 10.3: Respirators that have not been eliminated from Table 2 by the previous steps and that have APFs equal to, or greater than, the maximum hazard ratio determined in Step 7 are recommended.

Note: The maximum use concentration (MUC) is the maximum atmospheric concentration of a hazardous substance from which a respirator user can be expected to be protected by a class of respirator and is determined by the lesser of:

- APF X exposure limit
- The respirator manufacturer's MUC for a hazardous substance (if any)
- The IDLH, unless the respirator is a pressure-demand, full-facepiece SCBA or combination pressure-demand SAR with a full facepiece in combination with an auxiliary pressure-demand SCBA.

For multi-component mixtures the MUC can be calculated by:

$$C_1/MUC_1 + C_2/MUC_2 + \dots C_n/MUC_n = 1$$

Step 11. Combination Particulate and Gas/Vapor Respirators

Step 11.1: Is the combination respirator intended for "escape only" purposes?

If yes, refer to escape respirators on page 17, for a discussion and selection of "escape only" respirators.

If no, the combination respirator is intended for use during normal work activities. Proceed to Step 11.2.

Step 11.2: From Table 3, select a respirator type, not eliminated by the previous steps, and have APFs equal to, or greater than, the maximum hazard ratio determined in Step 7.

Note: the maximum use concentration (MUC) is the maximum atmospheric concentration of a hazardous substance from which a respirator user can be expected to be protected by a class of respirator and is determined by the lesser of:

- APF X exposure limit
- The respirator manufacturer's MUC for a hazardous substance (if any)
- The IDLH, unless the respirator is a pressure-demand, full-facepiece SCBA or combination pressure-demand SAR with a full facepiece in combination with an auxiliary pressure-demand SCBA.

For multi-component mixtures the MUC can be calculated by:

$$C_1/MUC_1 + C_2/MUC_2 + \dots C_n/MUC_n = 1$$

Form: Respirator Issuing Record

Respirator Selection Form

Chemical Name and Form	Air Concentration	IDLH	OEL	Hazard Ratio	MUC (if applicable)	Respirator Recommended
Respirator Selected:						

Appendix B: OSHA Medical Evaluation Questionnaire



OSHA Respirator Medical Evaluation Questionnaire

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 this 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 health care professional who will review it.*

Can you read (circle one): Yes No

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)

Name (Last, First, MI):		Today's date: / /	
Age (to nearest year):	Gender (circle one): M / F	Height: ft. in.	Weight: lbs.
Phone number (where you can be reached by the health care professional who reviews this questionnaire): ()			
The best time to phone you at this number:			
Address:			
(street)	(city)	(state)	(zip)
Job Title & Department:			

1. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes No

2. 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).



Environmental Health and
Radiation Safety

b. ___ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

3. 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.

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month? Yes No

2. Have you ever had any of the following conditions?

a. Seizures Yes No

b. Diabetes (sugar disease) Yes No

c. Allergic reactions that interfere with your breathing Yes No

d. Claustrophobia (fear of closed-in places) Yes No

e. Trouble smelling odors Yes No

3. Have you ever had any of the following pulmonary or lung problems?

a. Asbestosis Yes No

b. Asthma Yes No

c. Chronic bronchitis Yes No

d. Emphysema Yes No

e. Pneumonia Yes No

f. Tuberculosis Yes No

g. Silicosis Yes No



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- h. Pneumothorax (collapsed lung) Yes No
 - i. Lung cancer Yes No
 - j. Broken ribs Yes No
 - k. Any chest injuries or surgeries Yes No
 - l. Any other lung problem that you've been told about Yes No
4. Do you currently have any of the following symptoms of pulmonary or lung illness?
- a. Shortness of breath Yes No
 - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline Yes No
 - c. Shortness of breath when walking with other people at an ordinary pace on level ground Yes No
 - d. Have to stop for breath when walking at your own pace on level ground Yes No
 - e. Shortness of breath when washing or dressing yourself Yes No
 - f. Shortness of breath that interferes with your job Yes No
 - g. Coughing that produces phlegm (thick sputum) Yes No
 - h. Coughing that wakes you early in the morning Yes No
 - i. Coughing that occurs mostly when you are lying down Yes No
 - j. Coughing up blood in the last month Yes No
 - k. Wheezing Yes No
 - l. Wheezing that interferes with your job Yes No
 - m. Chest pain when you breathe deeply Yes No
 - n. Any other symptoms that you think may be related to lung problems Yes No
5. Have you ever had any of the following cardiovascular or heart problems?
- a. Heart attack Yes No



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- b. Stroke Yes No
 - c. Angina Yes No
 - d. Heart failure Yes No
 - e. Swelling in your legs or feet (not caused by walking) Yes No
 - f. Heart arrhythmia (heart beating irregularly) Yes No
 - g. High blood pressure Yes No
 - h. Any other heart problem that you've been told about Yes No
6. Have you ever had any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest Yes No
 - b. Pain or tightness in your chest during physical activity Yes No
 - c. Pain or tightness in your chest that interferes with your job Yes No
 - d. In the past two years, have you noticed your heart skipping or missing a beat Yes No
 - e. Heartburn or indigestion that is not related to eating Yes No
 - f. Any other symptoms that you think may be related to heart or circulation problems Yes No
7. Do you currently take medication for any of the following problems?
- a. Breathing or lung problems Yes No
 - b. Heart trouble Yes No
 - c. Blood pressure Yes No
 - d. Seizures Yes No
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 Yes No
 - b. Skin allergies or rashes Yes No



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- c. Anxiety Yes No
- d. General weakness or fatigue Yes No
- e. Any other problem that interferes with your use of a respirator Yes No
- 9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes No

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)? Yes No
- 11. Do you currently have any of the following vision problems?
 - a. Wear contact lenses Yes No
 - b. Wear glasses Yes No
 - c. Color blind Yes No
 - d. Any other eye or vision problem Yes No
- 12. Have you ever had an injury to your ears, including a broken eardrum? Yes No
- 13. Do you currently have any of the following hearing problems?
 - a. Difficulty hearing Yes No
 - b. Wear a hearing aid Yes No
 - c. Any other hearing or ear problem Yes No
- 14. Have you ever had a back injury? Yes No
- 15. Do you currently have any of the following musculoskeletal problems?
 - a. Weakness in any of your arms, hands, legs, or feet Yes No
 - b. Back pain Yes No
 - c. Difficulty fully moving your arms and legs Yes No



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- d. Pain or stiffness when you lean forward Yes No
- e. Difficulty fully moving your head up or down Yes No
- f. Difficulty fully moving your head side to side Yes No
- g. Difficulty bending at your knees Yes No
- h. Difficulty squatting to the ground Yes No
- i. Climbing a flight of stairs or ladder carrying more than 25-lbs. Yes No
- j. Any other muscle or skeletal problem that interferes with using a respirator Yes No

Signature of employee: _____

Date: _____

Form Available for Download Here:

https://campusoperations.temple.edu/sites/campusoperations/files/docs/ehrs/ehrs_files/handbook/documents/OSHARespiratorMedicalEvaluation.pdf

Appendix C: Respiratory Medical Clearance Form



Respiratory Medical Clearance Form

The Occupational Safety and Health Administration (OSHA) requires that a person be medically evaluated by a physician or other licensed health care professional to determine whether, and under what conditions, a worker (or student if applicable) can safely wear a respirator. This form allows your physician or other licensed health care professional to indicate whether you are medically cleared to safely wear a respirator in the course of your work without disclosing confidential medical information.

To be completed after a medical evaluation that includes review of the OSHA Respirator Medical Evaluation Questionnaire (Mandatory) Appendix C of 29 CFR 1910.134.

To be completed by the Respirator User:

Name: _____
TUID#: _____
Department/School: _____
Telephone #: _____
Email: _____

To be completed by a Physician or Other Licensed Health Care Professional:

I have performed a respirator medical evaluation, including review of the individual's OSHA Respirator Medical Evaluation Questionnaire Appendix C of 29 CFR 1910.134.

The identified individual is approved to wear (check all that apply):

N95 particulate respirator	<input type="checkbox"/> Without restrictions	<input type="checkbox"/> With restrictions _____
Half-mask, air purifying respirator	<input type="checkbox"/> Without restrictions	<input type="checkbox"/> With restrictions _____
Full-face, air purifying respirator	<input type="checkbox"/> Without restrictions	<input type="checkbox"/> With restrictions _____
Powered air purifying respirator	<input type="checkbox"/> Without restrictions	<input type="checkbox"/> With restrictions _____

If applicable, the following workplace conditions will result in additional physiological burden: _____

- Follow-up medical evaluation is required if ANY of the following occur prior to approval:
 - a positive response to any question among questions 1 through 8 in Section 2, Part A of the OSHA Respirator Medical Evaluation Questionnaire Appendix C was provided by the above identified individual; or
 - the initial medical examination demonstrates the need for a follow-up medical examination.

This user is approved to wear a respirator. Approval date: _____
 This user is not approved to wear a respirator.

I have provided the above identified individual a copy of this form: Yes No

Physician or Other Licensed Health Care Professional:

Printed name: _____ Signature: _____
Company Name: _____ Date: _____

This completed and signed form MUST be provided by the respirator user before the fit test organizers will conduct respirator fit testing.

2/2018

Form Available for Download Here:

https://campusoperations.temple.edu/sites/campusoperations/files/docs/ehrs/ehrs_files/safety/occupational-safety/documents/RespiratoryMedicalClearanceForm.pdf

Appendix D: Monthly Respirator Inspection Form



Monthly Inspection Form for 3M TR-600 Powered Air Purifying Respirator with Hood Assembly S-857

IMPORTANT! Initial each box in the right-hand column as you perform the inspection.
There are four units; please make sure each one is inspected.

Inspector: _____

Unit Serial Number: TR602No52581, TR602No52603, TR602No52567, TR602No52331

Date: _____

	YES	NO
The blower has a crack.	FAIL	
The breathing tube has tears, holes, or cracks.	FAIL	
Either end of the breathing tube is damaged.	FAIL	
The charge status on the battery pack is not indicated.	FAIL	
The battery pack is cracked.	FAIL	
The molding surrounding the electrical connection pins on the battery pack is missing.	FAIL	

Comments (specify the serial numbers of any units that failed):

January 2020

Appendix E: GUIDELINES FOR RESPIRATOR USE

The following are examples for general guidelines that are provided to respirator users. The information will be modified accordingly to reflect the appropriate manufacturer's information.



Environmental Health and
Radiation Safety
3307 N. Broad St.
Room B-49
Philadelphia, PA 19140

T 215-707-2520
F 215-707-1600
E ehrs@temple.edu
W temple.edu/ehrs

Respiratory Protection Guidelines for N95 Particulate Respirator

Respirator User's Name: _____

The following are Temple University's guidelines on the use of [Insert Manufacturer's model] N95 particulate respirators:

- Before use, store respirators in the original packaging away from contaminated areas, dust, sunlight, extreme temperatures, excessive moisture and damaging chemicals.
- Inspect the respirator before each use to ensure that it is in good operating condition.
 - Examine all parts of the respirator for signs of damage, including the two headbands (and fluid barrier if applicable).
 - The respirator should be disposed of immediately upon observation of damaged or missing parts.
 - The filtering facepiece must be inspected prior to each use to confirm that there are no holes in the breathing zone and no damage has occurred.
- A **seal check** must be performed every time you put on your respirator. **If you cannot achieve a proper seal, do not use the respirator.** **Note:** The exact steps for the seal check (which you were trained on during the fit-testing session) can be found in the instructions -- located on the box.
- The respirator cannot be used in an oxygen-deficient environment. Additionally, it does not provide protection against gases or vapors, or in areas where contaminants are unknown.
- Respirators can help protect your lungs against certain airborne contaminants. However, they will not prevent entry through other routes such as the skin and eyes, which would require additional personal protective equipment (PPE).
- **Time Use Limitation:**
 - If the respirator becomes damaged, hard to breathe through, or contaminated with hazardous materials (e.g., blood, other bodily fluids, respiratory or nasal secretions, or chemicals), leave the area and replace it with a new one.
 - For airborne pathogens and infection control, follow your department's policy and procedures on changing, storing, reusing, and disposing.
- **Immediately leave the contaminated area** and seek medical attention if dizziness, irritation, or other distress occurs.

- Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (for comfort or to maintain fit).
- The fit of your respirator must be retested whenever you have a change in your physical condition that could affect the fit of your respirator. Such changes include:
 - o significant weight gain or loss;
 - o major dental work (e.g., new dentures);
 - o facial surgery that may have changed the shape of your face; or,
 - o significant scarring in the area of the mask's seal.

Any of these changes could affect the ability of your respirator to properly seal to your face, which could allow contaminated air to leak into your respirator.

- Facial hair (e.g., stubble beard growth, beard, mustache, or sideburns) and/or other items (e.g., long hair, apparel, and/or earrings) that cross the respirator sealing surface can affect the respirator's ability to protect you. Any of the aforementioned items that come between a person's face and the respirator's seal can allow contaminated air to leak into the respirator, and you will not be protected.

Regarding facial hair, it is imperative that individuals are close-shaven when being fit-tested for a N95 particulate respirator. If, however, an individual prefers not to shave, a Powered Air Purifying Respirator (PAPR), where appropriate, can be worn as an alternative to provide respiratory protection. EHRS has a PAPR to train individuals on but will not supply this respirator while in the contaminated area.

- Failure to follow the noted instructions and limitations on the use of this respirator can reduce its effectiveness and may result in sickness or death.

RESPIRATOR FIT TEST

Date Test Performed: _____ Test Results: Passed Failed

Respirator Mask Type & Size Required for Airborne Precautions:

[Insert Manufacturer's model] N95 Particulate Respirator: Small Regular

Education Provided on Guidelines for Use, Application, and Management

RESPIRATOR USER'S SIGNATURE

TESTER'S SIGNATURE

THIS FORM WILL SERVE AS PROOF OF BEING FIT-TESTED ON A [INSERT MANUFACTURER'S MODEL] N95 PARTICULATE RESPIRATOR.

If you have questions regarding respiratory protection, please contact the Environmental Health and Radiation Safety Department at 215 707-2520 (2-2520).

Powered Air Purifying Respirator (PAPR) Instructions and Guidelines

RESPIRATOR USER'S NAME: _____

The following are Temple University's instructions and guidelines regarding use of the *3M Versaflo TR-300 Powered Air Purifying Respirator (PAPR)*:

TRAINING INFORMATION:

INSPECTION: An inspection must always be performed prior to each use of the respirator as follows:

1. *PAPR system:* Visually inspect the entire PAPR system including the motor/blower, cover, filter, breathing tube, battery pack, belt, headgear.
2. *Battery pack:* Confirm that the battery pack is fully charged, and the charge is enough while performing tasks.
 - a. The battery pack must be securely latched to the motor/blower.
 - b. Examine the blower housing for cracks or warping.
3. *Breathing tube:* Examine the entire breathing tube for tears, holes or cracks.
 - a. Bend the tube to verify that it is flexible.
 - b. Ensure the o-rings located at both ends of the breathing tube (i.e. headgear and air source connections) are present and not damaged.
 - c. The breathing tube should fit firmly into the air source connection.
4. *High Efficiency (HE) filter and pre-filter (if available):* Inspect filter(s) and seal for dirt, tears, cuts, distortion, or indentations.

ASSEMBLING AND DONNING PAPR

1. *Install HE filter and if using the prefilter:* 1) with the unit off, remove the filter cover; 2) place the HE filter and the pre-filter (if available) into the unit; 3) Ensure the HE filter label can be seen through the filter cover view window; and, 4) Place the filter cover back on the unit.
2. *Breathing tube:* 1) Insert the end of the breathing tube with the bayonet fitting (two small prongs) into the parallel slots in the air outlet of the motor/blower.; and, 2) twist the breathing tube 1/4 turn to the right to lock it into place.
3. *Airflow check:* 1) Insert the airflow indicator into the outlet on the motor/blower unit; and, 2) c. With the airflow indicator in a vertical position, ensure that the bottom of the floating ball rests at, or above, the minimum flow mark for the 'letter' representing your 'Zone.' Note: To determine your zone, look at the elevation and temperature for the environment where you are conducting the airflow check. If the airflow indicator ball fails to rise at or above the minimum flow level, do not use the motor/blower unit.
4. *Airflow alarm:* 1) remove the air flow indicator and tightly cover the outlet of the motor/blower with the palm of your hand; 2) continue to press your palm tightly against the end of the outlet, making a tight seal. After approximately 30 seconds, the unit will sound an audible alarm; and, 3) the last bar

on the filter loading/alarm indicator unit will turn red. Remove your hand from the end of the breathing tube; the audible alarm and the flashing red LED should both stop when the motor returns to a slower speed.

5. *Belt:* 1) install the belt by threading the end of the belt through the retaining slots on the back side of the motor/blower; 2) position the motor/blower so it rests in the small of the back or other location around the waist; and, 3) Tighten belt for a snug fit.
6. *Headgear:* Attach the head cover to the breathing tube and turn the motor/blower on.

GUIDELINES

- Do not enter a contaminated area until properly donning the respirator.
- Do not turn off the motor/blower, remove the facepiece or headgear, or reach your hand into the headgear while inside the contaminated area. This could allow contaminants to enter the respirator and may result in sickness or death.
- Do not wear this respirator where: 1) atmospheres contain hazardous vapors or gases; 2) atmospheres are oxygen deficient; and/or 3) contaminant concentrations are unknown.
- Leave the contaminated area immediately if any of the following conditions occur. Failure to do so may result in sickness or death.
 - Any part of the system becomes damaged.
 - Airflow into the respirator decreases or stops.
 - The low airflow or low battery alarms trigger. In the event an audible or visual alarm triggers, the user should immediately leave the contaminated area.
 - Breathing becomes difficult.
 - You feel dizzy or your vision is impaired.
 - You taste or smell contaminants.
 - Your face, eyes, nose or mouth become(s) irritated.
 - You suspect that the concentration of contaminants may have reached levels at which this respirator may no longer provide adequate protection.
- The HE filter may be left in place in the motor/blower for storage.
 - Replace HE filter if any damage is noted or suspected, or the low airflow alarm is activated (and the last bar on the filter loading/alarm indicator unit will turn red). If alarm condition continues for approximately 15 minutes, the TR-300 system will automatically shut down.
 - Do NOT attempt to clean the HE filter itself. However, the filter's seal can be clean with a cloth if necessary.
- If parts are missing or damaged, replace them only with 3M TR-300 replacement parts before proceeding.
- Follow the manufacturer's instruction for proper cleaning procedures.

POWERED AIR PURIFYING RESPIRATOR TRAINING INFORMATION

Date Trained: _____ Education Provided on Guidelines for Use, Application & Management

RESPIRATOR USER'S SIGNATURE

TESTER'S SIGNATURE

THIS FORM WILL SERVE AS PROOF OF BEING TRAINED ON A 3M VERSAFLO TR-300 PAPR.

If you have questions regarding respiratory protection, please contact the Environmental Health and Radiation Safety Department at 215 707-2520 (2-2520).

Guidelines for Pandemic Extended Use, Re-Use, and Use of Expired NIOSH-approved N95 Particulate Respirators

The COVID-19 pandemic created an increased demand for NIOSH-approved N95 particulate respirators, which limited the availability for use in protecting individuals' exposure to the virus. During the shortage, the following are guidelines to consider for extended use, re-use, and use of expired NIOSH-approved N95 particulate respirators.

Extended use: The practice of wearing the same NIOSH-approved N95 particulate respirator for repeated close contact encounters with several patients, without removing the respirator between patient encounters.

- A key consideration for safe extended use is that the respirator must maintain its fit and function. It must be discarded when:
 - used for aerosol generating procedures;
 - close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions;
 - contaminated with biological materials (e.g., blood, respiratory or nasal secretions, or other bodily fluids) or chemicals; or,
 - damaged or breathing becomes difficult.
- Individuals must minimize unnecessary contact with the respirator's surface and adhere to hand hygiene practices if adjustment is necessary. **Note:** Hand hygiene must be performed before donning and after doffing as well.
- Consider using a face shield over the respirator and/or other steps (e.g., masking patients) to reduce/prevent contamination. **Note:** The face shield must be cleaned after use between patients if it's non-disposable (preferred and the manufacturer's instructions must be reviewed). Disposable face shields must be discarded after a single use.
- The maximum extended use period for the respirator is 8-hours. **Note:** The respirator must not be worn for multiple work shifts or reused after extended use.
- The respirator must be removed and discarded before activities such as meals and restroom breaks.

Re-use: The practice of using the same NIOSH-approved N95 particulate respirator for multiple encounters with patients but removing it after each encounter.

- The respirator must only be worn and/or reused by a single wearer.
- Follow the manufacturer's maximum number of donning (or up to five if the manufacturer does not provide a recommendation) and recommended inspection procedures.
- The respirator must be discarded when:
 - used for aerosol generating procedures;

- close contact with any patient co-infected with an infectious disease requiring contact precautions;
 - contaminated with biological materials (e.g., blood, respiratory or nasal secretions, or other bodily fluids) or chemicals;
 - damaged or deformed;
 - no longer forms an effective seal to the face;
 - wet or visibly dirty; or,
 - breathing becomes difficult.
- Hand hygiene must be performed before donning, after doffing, and adjusting the respirator.
 - The respirator must be carefully removed to avoid cross-contamination (refer to the user's instructions). **Note:** Individuals must avoid touching the inside of the respirator. If inadvertent contact is made with the inside of the respirator, he/she must discard the respirator and perform hand hygiene.
 - Consider using a face shield over the respirator to reduce/prevent contamination. **Note:** The face shield must be cleaned after use if it's non-disposable (preferred and the manufacturer's instructions must be reviewed). Disposable face shields must be discarded after a single use.
 - The respirator must be stored in a clean, dry location to ensure that the physical integrity and efficacy of the device is not compromised. For example, the respirator can be stored in a breathable container such as a paper bag. *Do not store N95 respirators for reuse in a non-breathable container such as a plastic zip-lock type bag to prevent microbial propagation.*
 - The container/bag should be labeled with the user's name. **Note:** Individuals must refrain from labeling the respirator to prevent damaging it.
 - The bag is a single use item, because the inside can become contaminated due to storing a used respirator. Therefore, it should be discarded after the respirator is re-donned.
 - The respirator must be inspected before each use to ensure its physical integrity is intact, and a seal-check must be performed to ensure an adequate fit.

Expired Respirators: NIOSH-approved N95 particulate respirators that are past their manufacturer's shelf life.

- The respirator cannot be used when:
 - performing surgical procedures on patients infected with, or potentially infected with, SARS-CoV-2;
 - performing or are present for procedures expected to generate aerosols; or,
 - procedures where respiratory secretions are likely to be poorly controlled (e.g., cardiopulmonary resuscitation, intubation, extubation, bronchoscopy, nebulizer therapy, sputum induction).
- The respirator cannot be co-mingled with other N95 respirators that are within their shelf life.
- Individuals must visually inspect the respirator to determine if the structural and functional integrity was compromised. Over time, components such as the straps, nose bridge, and nose foam material may degrade, which can affect the quality of the fit and seal.

If you have questions regarding respiratory protection, please contact the Environmental Health and Radiation Safety Department at 215 707-2520 (2-2520).

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