



DEPARTMENT OF ENVIRONMENTAL SAFETY, SUSTAINABILITY & RISK

EFFECTIVE DATE: January 2023

SUBJECT: Respiratory Protection Program

DESCRIPTION: This program summarizes requirements for protecting University of Maryland (UMD) staff, faculty and students (UMD personnel) from respiratory hazards at any location on campus. This program also describes duties and responsibilities of UMD personnel with respect to respiratory protection that apply to UMD.

SCOPE: The Respiratory Protection Program (RPP) applies to all faculty and staff who wear respiratory protection. This program includes direction for the following:

- Selecting respirators for use in the workplace
- Medical evaluations for respirator use
- Training of UMD personnel in respiratory hazards, respirator use, fit testing procedures, and limitations, as well as periodic investigations of the program
- Fit testing procedures for tight-fitting respirators
- Proper use of respirators in routine and emergency situations
- Maintaining respirators
- Forms for site-specific RPP information

The scope of this program does not include Supplied Air Underwater Breathing Apparatus Diving requirements under 29 CFR 1910.424.

OFFICE OF PRIMARY RESPONSIBILITY: Department of Environmental Safety, Sustainability & Risk (ESSR)

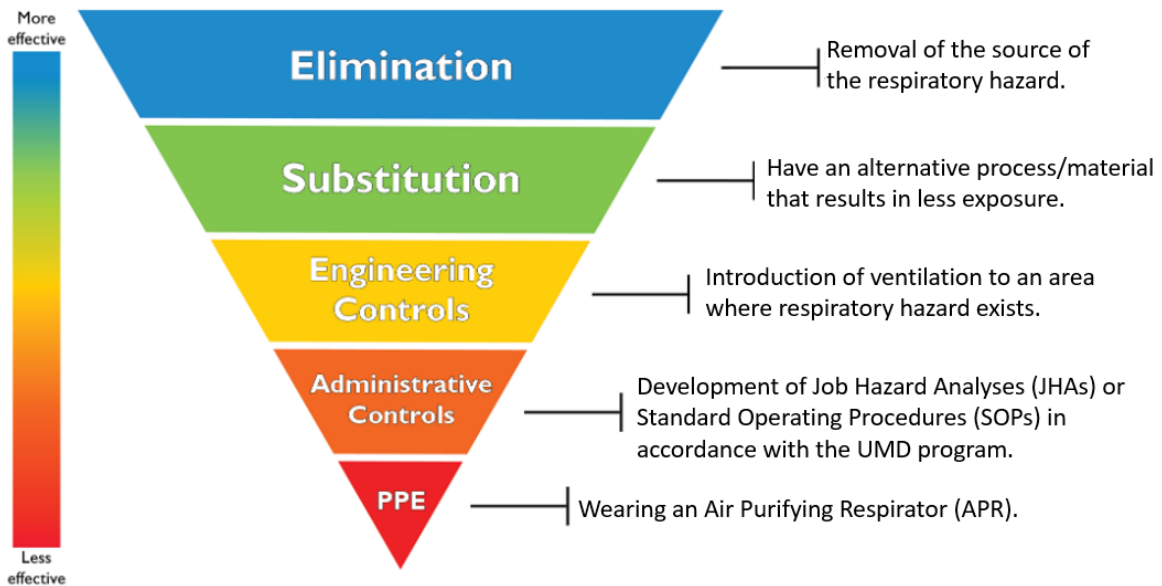
SUMMARY OF CHANGES:

- Incorporating new requirements from ANSI/ASSE Z88.2 – 2015 Practices for Respiratory Protection
- Clarifying training and re-training requirements for UMD personnel
- Clarifying roles and responsibilities
- Revising the Hazard Evaluation process
- Establishing requirements for qualitative fit tests

Program Overview

The RPP was created to comply with respiratory protection standards and regulatory requirements to ensure that operations performed under UMD campus units are performed safely by UMD faculty, staff and students who are provided with appropriate controls, including engineering controls, safe work procedures, training, protective equipment, and any other identified methods (See Figure 1 below).

Figure 1: Hierarchy of Controls with Examples that may apply to UMD



Adapted from National Institute of Occupational Safety and Health:

<https://www.cdc.gov/niosh/topics/hierarchy/default.html>. Note: UMD elements pertinent to controls are provided.

UMD Requirements

The requirements in this document must be adhered to by all UMD personnel working with or near identified respiratory hazards, or who have opted to obtain respiratory protection without being required to do so. The document is intended to reduce the risk of respiratory injury to personnel working on or near airborne hazards. All UMD personnel must comply with the requirements of this document that apply to their operations.

Duties and Responsibilities

This program includes responsibilities for the following:

- The Department of Environmental Safety Sustainability and Risk

- The Occupational Health Unit of the University Health Center
- Deans, Directors, or Department Heads
- Department Coordinators
- Managers and Supervisors
- Researchers and students
- UMD personnel
- Visitors/Contractors

Training

This policy outlines the necessary training requirements for persons working in the presence of respiratory hazards. See “Training” § VII of this document.

Resources and Authorities

- 29 CFR, Part 1910, Subpart I, Personal Protective Equipment, including 29 CFR 1910.134, Respiratory Protection, including Appendices A; B-1; B-2; C; and D.
- 29 CFR Part 1926, Subpart E, Personal Protective and Life Saving Equipment, including 29 CFR 1926, Respiratory Protection
- ANSI/ASSE Z88.2 – 2015 Practices for Respiratory Protection
- ASTM F3387-19, Standard Practice for Respiratory Protection
- NIOSH [2018]. Filtering out Confusion: Frequently Asked Questions about Respiratory Protection, Fit Testing. By Krah J., Shamblin M., and Shaffer R. Pittsburgh, PA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication 2018–129, <https://doi.org/10.26616/NIOSH PUB2018129external icon>
- NIOSH [2018]. A Guide to Air-Purifying Respirators. By Cichowicz J, Coffey C, Fries M. Pittsburgh, PA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2018-176, <https://doi.org/10.26616/NIOSH PUB2018176external icon>
- Centers for Disease Control and Prevention/NIOSH (2022) The National Personal Protective Technology Laboratory (NPPTL). Certified Equipment List https://www2a.cdc.gov/drds/cel/cel_form_code.asp
- NIOSH [2004]. Respirator Selection Logic. DHHS (NIOSH) Publication Number 2005-100

Table of Contents

| | |
|---|-----------|
| General Information | 1 |
| A. Introduction | 1 |
| B. Purpose | 1 |
| C. Scope | 1 |
| D. Background | 2 |
| II. Regulatory, UMD, and Best Practice Requirements | 2 |
| A. Federal Requirements (OSHA) | 2 |
| B. National Consensus Standards | 2 |
| C. UMD Requirements | 2 |
| III. Duties and Responsibilities | 3 |
| A. The Department of Environmental Safety, Sustainability and Risk (ESSR) | 3 |
| B. The Occupational Health Unit of the University Health Center (UHC-OHU) | 5 |
| C. Department Directors | 5 |
| D. RPP Unit Coordinators | 5 |
| E. UMD personnel and Students | 7 |
| IV. Determination of the Need for Respiratory Protection | 8 |
| A. Hazard Evaluation | 8 |
| V. Medical Evaluation | 12 |
| A. Medical Evaluation Procedures | 12 |
| VI. Respirator Selection | 9 |
| A. Required Elements for Respirator Selection | 9 |
| B. Respirator Use in IDLH/Unknown Substantial Risk Atmospheres | 10 |
| C. Respirators for Use in Permit-Required Confined Spaces | 11 |
| D. Air Quality – Atmosphere Supplying Respirators | 11 |
| E. Voluntary Use | 13 |
| VII. Respiratory Protection Program Training | 14 |
| A. Attendees | 14 |
| B. Content and Access | 14 |
| C. Frequency | 14 |
| VIII. Fit Testing | 15 |
| A. OSHA Approved Protocols | 15 |
| B. Fit Testing Requirements at UMD | 15 |
| IX. Maintenance and Care | 16 |
| A. Cleaning & disinfecting | 16 |
| B. Storage | 17 |
| C. Inspection | 17 |
| Respirator Type | 17 |
| Frequency of Inspection | 17 |
| ESSR OSH RPP April 2024 | 1 |
| | Version 2 |

| | | |
|-----|--|------|
| X. | Respiratory Protection Plans and Annual Self-Assessments | 19 |
| A. | Department-Specific Respiratory Protection Plans | 19 |
| B. | Annual Self-Assessments | 19 |
| XI. | Records | 19 |
| A. | Medical clearances, training records, and fit testing records must all be maintained by UMD. | 19 |
| | APPENDIX A - Acronyms | A-1 |
| | APPENDIX B - Definitions | B-1 |
| | Appendix C-1: Respiratory Protection Plan Programmatic Elements | C1-1 |
| | Appendix C-2: Respiratory Protection Decision Chart | C2-1 |
| | Appendix D: Respiratory Protection Hazard Evaluation | D-1 |
| | Appendix E: Proper Use of Assigned Protection Factors and Maximums Use Concentrations | E-1 |
| | Appendix F: Qualitative Fit Test Record | F-1 |
| | Appendix G: Site-specific Respiratory Protection Plan | G-1 |
| | Appendix H: Self-Assessment Checklist for the UMD Respiratory Protection Program | H-1 |

General Information

A. Introduction

This program addresses UMD requirements related to respiratory protection. The general requirements, safe work practices, and program audit checklists outlined in this program are intended to reduce the risk of injury to personnel working in areas with potential respiratory hazards.

B. Purpose

The purpose of this RPP is to establish the requirements for compliance with applicable respiratory protection regulations and standards and to protect the safety and health of UMD faculty, staff and students against respiratory hazards. These hazards include airborne contaminants such as biological contaminants, dusts, mists, fumes, and gasses, or oxygen-deficient atmospheres.

C. Scope

1. This program applies to UMD faculty, staff, and students who are required to wear NIOSH-approved respirators during normal work operations, non-routine or emergency operations while on UMD-owned property and/or worksites, while traveling and working at remote locations. The program also covers the voluntary use of NIOSH-approved respiratory protection.

The program excludes any other PPE used in conjunction with respiratory protection, or face covering that may be used during public outbreaks of respiratory illness.

2. This program establishes procedures to identify respiratory hazards that are present or likely to be present in the UMD workplace. It covers:
 - 2.1 Assessment of respiratory hazards in the workplace
 - 2.2 Implementation of the hierarchy of controls for respiratory protection
 - 2.3 Selection of respirators for use when respiratory hazards are present
 - 2.4 Medical evaluations for respirator use
 - 2.5 Training of UMD personnel in respiratory hazards, respirator use, and limitations
 - 2.6 Fit testing procedures for tight-fitting respirators
 - 2.7 Procedures for proper use of respirators in routine and emergency situations
 - 2.8 Procedures and schedules for maintaining respirators

2.9 Procedures for evaluating the effectiveness of the RPP

2.10 Forms for site-specific RPP information.

3. This program shall be used in conjunction with the other applicable programs as part of an overall occupational health and safety management system with an emphasis on safety and continual improvement.

D. Background

1 Definitions and Acronyms

1.1 Acronyms for the RPP can be found in Appendix A

1.2 Definitions for the RPP can be found in Appendix B

II. Regulatory, UMD, and Best Practice Requirements

A. Federal Requirements (OSHA)

1. 29 CFR, Part 1910, Subpart I, Personal Protective Equipment, including 29 CFR 1910.134, Respiratory Protection, including Appendices A; B-1; B-2; C; and D
2. 29 CFR Part 1926, Subpart E, Personal Protective and Life Saving Equipment, including 29 CFR 1926, Respiratory Protection

B. National Consensus Standards

1. ANSI/ASSE Z88.2 – 2015 Practices for Respiratory Protection 29 CFR 1910.269, Electric Power Generation, Transmission and Distribution
2. ASTM F3387-19, Standard Practice for Respiratory Protection

C. UMD Requirements

General UMD Respiratory Protection Requirements cover control of potential hazards in the workspace such as chemical and biological hazards, as well as increased awareness required when personnel are present within the work environment. Please see Appendices C-1 and C-2 for the decision-making processes in accordance with this program.

1. Hierarchy of controls.

Risks must be eliminated/reduced in accordance with the hierarchy of controls principle. All UMD faculty, staff and students; as well as contractor personnel must follow the hierarchy of controls to minimize risks from respirable hazards.

- 1.1. Elimination: All respiratory hazards must be eliminated (physically removed) when feasible by decommissioning or relocating the source of the hazard.
 - 1.2. Substitution: All respiratory hazards must be replaced when feasible to lessen exposure. Examples of substitution may be replacing a harmful chemical with a less toxic one, or changing the location of the work.
 - 1.3. Engineering controls: To the extent feasible, modifications of all process equipment, or the installation of further equipment must be implemented with the goal of preventing the release of respiratory contaminants into the workplace. Examples may include dust collection systems, fume hoods or ventilation.
 - 1.4. Administrative controls (or work practice controls): To the extent feasible, UMD departments must implement changes in work procedures such as written safety policies, rules, supervision, schedules, and training with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations. Examples may include posting signs, tags, procedures, or changes in respiratory protection practices resulting from employee participation in safety committees.
 - 1.5. Personal protective equipment: After all controls above are exhausted and the hazardous exposure remains, respirators appropriate for the hazard shall be provided and used after prerequisites (e.g., medical clearance and fit testing) are complete.
2. General minimum requirements
ESSR, Department heads and supervisors must collectively ensure the implementation of appropriate respiratory process elements, requirements, procedures and safe practices for all UMD personnel. Requirements shall address risks associated with employee exposures such as mists, smoke, fumes, dusts and particulates.

III. Duties and Responsibilities

This section outlines responsibilities for The Department of Environmental Safety, Sustainability and Risk (ESSR), the Occupational Health Clinic of the University Health Center (UHC-OHU), directors, supervisors, principal investigators, and respirator users.

A. The Department of Environmental Safety, Sustainability and Risk (ESSR)

1. Establish and maintain a respiratory protection program consistent with federal regulations (29 CFR 1910.134) and the UMD goal of protecting UMD personnel from hazardous respirable exposures. Appendices C-1

and C-2 provide the programmatic elements and decision-making flowcharts.

2. Assign a RPP Administrator within the Occupational Safety and Health unit to Serve as the office of primary responsibility.
3. Provide assistance and support in UMD's compliance with this program.
5. Provide guidance and training to UMD personnel regarding this respiratory protection program.
6. Conduct analyses of respiratory hazards in the workplace when requested by an employee, supervisor, or other departmental representative.
7. Assist with evaluating, developing, and implementing controls to reduce the need for respiratory protection through elimination, substitution, engineering, and/or administrative controls.
8. Act as an information resource for problems and questions related to respiratory protection.
10. Provide all quantitative fit testing for respiratory users.
11. Provide training and periodic review for staff who are performing fit testing fit testing outside of ESSR.
12. Upon request, provide qualitative fit testing for respiratory users.
13. Maintain a sufficient array of fit-testing equipment (including various models and sizes of respirators and cartridges) to ensure that the user can find a facepiece that is acceptable to them and fits correctly.
14. Maintain exposure monitoring, training, and fit testing records in the safety management database.
15. Review and revise the RPP annually and as necessary.
16. Evaluate knowledge and approve a unit RPP Coordinators who will adhere to the RPP and be point-of-contact for developments with the program.
17. In order to assess compliance with UMD RPP, perform yearly audits (with an advanced 2-week notice) to units that have personnel required to wear respiratory protection.

B. The Occupational Health Unit of the University Health Center (UHC-OHU)

1. Administer respirator medical evaluation questionnaires per 29 CFR 1910.134 to individuals placed in the respiratory protection program. Respirator medical evaluation questionnaires are required prior to initial fit testing and required wearing of a respirator.
2. Conduct the necessary medical evaluations and consultations to determine the ability of UMD personnel to wear respirators.
3. Formally notify the employee, their supervisor, and ESSR OSH (osh@umd.edu) if a medical restriction is applied.
4. Formally notify the employee, their supervisor, and ESSR OSH (osh@umd.edu) if medical clearance is approved.
5. Provide the medical record to the employee.
6. Retain UMD personnel' RPP medical clearances for the duration specified in UHC – OHU procedures.
7. Periodically review the overall effectiveness of the provision of medical services related to the proper use of respirators as outlined in this program.

C. Department Directors

1. Designate a Coordinator within a department to hold the RPP responsibilities for that position (See § III.D. following).

D. RPP Unit Coordinators

1. Attend [respiratory protection training](#), identifying yourself as a Coordinator. The training will include a segment on Coordinator responsibilities.
2. Oversee implementation of this program.
3. Implement the requirements of this program within their organizations.
4. Where hazards are identified in the Department, ensure that Respiratory Protection Hazard Evaluations (Appendix D) have been completed and are up to date.

5. Direct the establishment of a recordkeeping system for maintaining the required written elements of this program.
6. Evaluate the overall effectiveness of the respiratory protection program. Ensure that personnel are made aware of the potential hazards associated with work near potential respiratory hazards.
7. Where respiratory hazards are known or suspected in your unit, in partnership with ESSR OSH, develop Respiratory Protection Hazard Evaluations (Appendix D of this program) and submit the completed forms to ESSR OSH (osh@umd.edu). In completing the Hazard Evaluations, ensure that all controls (See § II.C.1) are implemented to the full extent possible.
8. If personnel are exposed to respiratory hazards above the established exposure limits, or engaged in operations that will likely present unsafe exposures, ensure that these UMD personnel are enrolled in the UMD RPP.
9. Retain records (See Section XI of this program) of the Respiratory Health Hazard Evaluations for the duration of the conditions necessitating the evaluations.
10. Schedule mandated initial respiratory protection training and provide instructions to UMD personnel on how to schedule the fit testing with ESSR using the following link: <https://essr.umd.edu/about/occupational-safety-health/respiratory-protection>. These fit tests must be in accordance with the Quantitative and/or Qualitative protocols established by OSHA (29 CFR 1910 Appendix A).
 - 10.1 Based on the Hazard Evaluation conducted (Section IV.A), personnel who are exposed to levels deemed hazardous (e.g., exposure limit exceeded), or those required to wear elastomeric respirators, quantitative fit tests must be scheduled with ESSR.
 - 10.2 Personnel required to wear filtering facepieces may have qualitative fit tests conducted by ESSR or the Department.
11. Provide respirators, spare parts, filters, and other applicable equipment to ensure that employee has access to properly functioning respiratory protection PPE.
12. Identify and maintain a documented list of UMD personnel who are in the RPP and required to wear respiratory protection.
13. For all UMD personnel required to use a respirator, direct the employee to complete and submit a medical questionnaire via the [UHC OHU website](#) to

the UHC- OHU. This questionnaire indicates whether the employee is medically able to use that respirator.

Exception: UMD units are not required to include in this RPP UMD personnel whose only use of respirators involves the voluntary use of filtering facepieces (e.g., N-95; N-99). No medical questionnaire is required for voluntary users.

14. If qualitative fit testing is used, complete the fit test record form (Appendix F) and retain it within the employee's records through the duration of employment.
15. Direct UMD personnel to clean, store, and maintain the respirators according to manufacturer directions so that their use does not present a health hazard to the user.
16. Ensure that copies of this program and associated supporting documents are made available to the UMD personnel.
17. Develop a Site-specific Respiratory Protection Plan (form is located in Appendix F of this program).
18. Conduct annual audits, using the Audit Checklist. Where deficiencies are found, develop corrective measures with all involved parties.
19. Maintain copies of completed Audit Checklists.
20. Coordinate training for UMD personnel. This entails contacting ESSR to provide initial training or conducting the training according to the required elements of this program.
21. Ensure that the refresher is completed yearly via contact with ESSR (osh@umd.edu).
22. Retain training individual employee training records for the duration of the employment.
23. Ensure all program audits, hazard findings, and corrective actions are documented.
24. Participate in incident investigations and track corrective and preventive actions to completion.

E. UMD personnel and Students

1. Follow safe work practices described in this document and use respiratory protection as directed in this program and in conformance to manufacturer.

2. If required to wear a respirator, use only respiratory protection for which you have received fit testing and training, and only for the tasks specified.
3. If voluntarily using an elastomeric respirator, schedule fit-testing and training with ESSR.
4. Schedule mandated annual fit testing and training sessions with ESSR via osh@umd.edu.
5. Maintain and store respiratory protection PPE in accordance with this program and the manufacturer's recommendations.
6. Conform to all safety programs used in conjunction with this RPP.
7. Immediately report any concerns (e.g., wear issues, respirator deficiencies or malfunctions) to Supervisor or ESSR, as appropriate.

IV. Determination of the Need for Respiratory Protection

A. Hazard Evaluation

Respiratory hazards may be present in the workplace in forms of dust, fibers, fumes, mists, gases, vapors and biological hazards. Prior to the selection and use of respirators, supervisors assisted by ESSR personnel, will identify and evaluate the respiratory hazards in subject areas to determine if respiratory protection is likely necessary. In such cases where it is suspected that conditions may merit respiratory protection, supervisors should complete the Respiratory Hazard Evaluation Form (Appendix D) and submit this to ESSR OSH (osh@umd.edu). Should supervisors require help with the evaluation, contact OSH (osh@umd.edu).

1. The evaluation must include the following:
 - 1.1. A complete evaluation of the Hierarchy of Controls (§ II.C.1. of this program).
 - 1.2. Identification of the respiratory hazards associated with the substance(s) that are being evaluated. Information may include:
 - A. Product labels
 - B. Safety Data Sheets (SDSs)
 - C. Manufacturer data
2. Determination of the potential exposure limits (e.g., PELs, accepted consensus standards) to these hazardous substances, through evaluation of the process, discussions with UMD personnel, and/or air monitoring.

3. Consideration of controls (see § II.C.1 of this program) which would eliminate the need for respiratory protection.
4. Consideration of other factors affecting respirator use and reliability. These include:
 - 4.1. Additional PPE needed for the job task which may affect respirator use
 - 4.2. Duration and frequency of respirator use
 - 4.3. Determination of whether use is routine, periodic, or for emergencies
 - 4.4. Worksite factors:
 - 4.4.1. Temperature
 - 4.4.2. Relative humidity
 - 4.4.3. Estimated physical effort
5. Recommendations from the UHC-OHU regarding the employee's respirator use.
6. The need for additional hazard evaluation, based on:
 - 6.1. New state or federal standards
 - 6.2. New hazards identified

If there is a potentially significant inhalation hazard, an industrial hygiene assessment will be completed. This is necessary to determine the required respirator protection factor.

V. Respirator Selection

The Unit RPP Coordinator, with any needed assistance from ESSR OSH, will select respirators to be used, based on the hazards to which UMD personnel are exposed and in accordance with all Occupational Safety and Health Administration (OSHA) standards. Refer to Appendices C-1 and C-2 for flowcharts which show the programmatic elements and decision-making for respiratory protection PPE.

A. Required Elements for Respirator Selection

1. When respirator use is required, respirators must be provided at no cost to the employee by the employee's department or unit following their medical evaluation and training, also at no cost for the employee. All

respirators used by UMD UMD personnel must be NIOSH-certified and used according to manufacturer's instructions.

2. After the employee completes training and fit-testing, the make and model will be determined using American National Standards Institute (ANSI) Practices for Respiratory Protection Z88.2 2018, [National Institute for Occupational Safety and Health \(NIOSH\) Certified Equipment List](#), the NIOSH Respirator Selection Decision Logic as a guide and/or 29 CFR 1910.134 Table 1. – Assigned Protection Factors.
3. Supervisors are required to have respirator selection criteria reassessed whenever circumstances change that may compel use of different levels of respiratory protection or if the work environment places increased physical demands upon the employee.
4. Respirators for non-Immediately Dangerous to Life or Health (IDLH) conditions are selected as appropriate based on the assigned protection factor (APF) and maximum use concentration (MUC) (See Appendix E).
5. For conditions that are IDLH, MUCs may not be used; instead, UMD personnel must use respirators listed for IDLH conditions.
6. The following respirator types are approved for use in IDLH atmospheres:
 - 6.1 A [NIOSH certified](#) Full facepiece pressure demand SARs with auxiliary SCBA unit.
 - 6.2 A [NIOSH certified](#) full facepiece pressure demand SCBAs, with a minimum air delivery duration of 30 minutes.
 - 6.3 An escape only [NIOSH-certified](#) with a minimum air delivery duration of 5 minutes.

B. Respirator Use in IDLH/Unknown Substantial Risk Atmospheres

1. The following respirator types are approved for use only for UMD personnel who have been qualified in OSHA's 40-hour Hazardous Waste Operations and Emergency Response Operations (HAZWOPER) course:
 - 1.1. Atmosphere-Supplying Respirators (ASRs) which include full facepiece pressure demand SARs with auxiliary SCBA unit or full facepiece pressure demand SCBAs, with a minimum service life of 30 minutes, must be provided.
 - 1.2. Respirators used for escape only are NIOSH-certified for the atmosphere in which they will be used.

C. Respirators for Use in Permit-Required Confined Spaces

1. Workers who may be engaged in entering permit-required confined spaces must be trained in respiratory protection.
2. Consistent with UMD's Confined Space Entry Program, the Permit-Required Confined Space must involve use of a multi-gas monitor which can indicate respiratory hazards indicated by the presence of an oxygen deficiency or toxic substances above exposure limits.
3. If testing reveals oxygen-deficiency or the presence of toxic gases or vapors, the space must be ventilated and retested before workers enter.
4. Ventilation by a blower or fan may be necessary to remove harmful gases and vapors from a confined space.
5. If ventilation is not possible and entry is necessary (for emergency rescue, for example), workers must have appropriate respiratory protection. This may include:
 - 5.1 Air-purifying respirators for conditions where the exposure limits are exceeded.
 - 5.2 Atmosphere-supplying respirators by qualified personnel for IDLH conditions or oxygen-deficiency.

D. Air Quality – Atmosphere Supplying Respirators

1. Only grade D breathing air shall be used. Grade D breathing air is described in ANSI/Compressed Gas Association Commodity Specification for air, G-7.1-1989 and includes:
 - 1.1 Oxygen content (v/v) of 19.5% - 23.5%
 - 1.2 Hydrocarbon (condensed) content of 5 mg/m³ of air or less
 - 1.3 Carbon monoxide content of 10 ppm or less
 - 1.4 Carbon dioxide content of 1,000 ppm or less
 - 1.5 Lack of noticeable odor
2. Supplier documentation of breathing air quality should be obtained yearly, and should be readily available for the yearly ESSR audits.

VI. Medical Evaluation

UMD personnel who are required to wear respirators must pass a medical exam before being permitted to wear a respirator on the job. UMD personnel are not permitted to wear respirators until a physician or licensed health care professional (PLHCP) has issued a medical clearance certificate stating that the employee is medically able to do so. Any employee refusing the medical evaluation will not be allowed to work in an area requiring respirator use.

A. Medical Evaluation Procedures

1. The employee's department contacts UHC-OHU to arrange for medical evaluation of the employee.
2. The Unit Coordinator or supervisor will instruct the employee to schedule an appointment with the UHC to complete the respirator form in the UHC electronic medical record.
 - 2.1. If the employee does not have access to a computer, the UHC will provide them a paper copy to complete.
3. During normal work hours, and at a location of the UMD personnel' choosing, the employee(s) completes and submits the respirator medical questionnaire.
 - 3.1 To the extent feasible, the Unit Coordinator, with the help of ESSR OSH, will assist the understanding of UMD personnel who are unable to read the questionnaire. When this is not possible, the employee will be sent directly to the medical practitioner for medical evaluation.
4. Follow-up medical exams will be granted to UMD personnel as required by the standard, and/or as deemed necessary by the medical practitioner.
5. All UMD personnel will be granted the opportunity to speak with the medical practitioner about their medical evaluation, if they so request.
6. Medical evaluation parameters and frequency of evaluations are determined by the PLHCP.
7. Based on the answers to the questionnaire, the UHC-OHU may request an in-person consultation. The supervisor is responsible for scheduling the appointment and assuring employee attendance.
8. UMD personnel, their supervisors, and ESSR will be provided a pass/fail document of medical clearance for respirator use and will include an expiration date for the clearance. The expiration date is at the discretion of the PLHCP.

9. Supplementary information must be provided to Occupational Health with the questionnaire. This information includes:
 - 9.1 The type and weight of the respirator to be worn by the employee
 - 9.2 The duration and frequency of respirator use (including for emergency and escape)
 - 9.3 The expected physical work effort
 - 9.4 Additional protective clothing and equipment to be worn
10. Based on the following circumstances, additional medical evaluations must be conducted:
 - 9.1 An employee reports signs and/or symptoms related to their ability to use a respirator, such as shortness of breath, dizziness, chest pains, or wheezing. The employee or supervisor should contact the UHC-OHU immediately if this occurs.
 - 9.2 The PLHCP determines that the employee needs to be re-evaluated.
 - 9.3 Observations made during fit testing indicate a need for re-evaluation.
 - 9.4 A change occurs in workplace conditions that may result in an increased physiological burden on the employee.
11. When an employee's medical certification is due for renewal, the supervisor shall schedule the individual for an appointment with the UHC-OHU at least 30 days prior to the expiration date.

B. Voluntary Use

Voluntary use of respiratory protection means that an employee chooses to wear a respirator, even though a respirator is not required by the employer or by any OSHA standard.

UMD personnel who voluntarily use filtering facepiece respirators (e.g., N95, N100) are excluded from all requirements of this program except that RPP Coordinator must provide these UMD personnel with a copy of [29 CFR 1910 Appendix D of the standard](#). This form details the requirements for voluntary use of respirators by UMD personnel.

1. Disposable N95, N99 respirators may be voluntarily worn without medical surveillance. If an elastomeric respirator is desired for voluntary use, contact ESSR to set up training and fit-testing.
2. OSH shall authorize voluntary use of filtering facepieces as requested by UMD UMD personnel on a case-by-case basis, depending on specific workplace conditions.

VII. Respiratory Protection Program Training

ESSR OSH or an approved Coordinator or designee will provide initial training to respirator users and their supervisors on the contents of the Respiratory Protection Program and their responsibilities. The Coordinator or designee will conduct hazard-specific training for respirator users.

A. Attendees

1. UMD personnel required to use the respirator will be trained prior to using a respirator in the workplace, and annually thereafter.
2. Prior to supervising UMD personnel that must wear respirators, Supervisors must also be trained in the elements of this program.

B. Content and Access

1. Initial respiratory protection training will either be in-person or via video completion with ESSR.
2. The training shall adhere to the requirements delineated in OSHA 29 CFR 1910.134-part K (1) through (6) and will include complete demonstrations for usage and upkeep of the equipment.
3. Annual refresher training will need to be completed on-line via Bioraft using the following link: <https://umd.bioraft.com/node/2068648/sessions>.
4. Specialized additional training will be required for personnel assigned to ASR equipment. This training must be provided by ESSR OSH.

C. Frequency

1. Training, at a minimum, shall be provided to affected UMD personnel two weeks in advance of their initial assignment, annually thereafter, and whenever a new respiratory hazard the employee has not previously been trained on is introduced into their work area.

VIII. Fit Testing

A. OSHA Approved Protocols

Currently there are four protocols approved for Qualitative Fit Testing, and six protocols approved for Quantitative Fit Testing ([29 CFR 1910.134 Appendix A](#)):

1. Qualitative
 - 1.1 Isoamyl Acetate Protocol
 - 1.2 Saccharin Solution Aerosol Protocol
 - 1.3 Bitrex (Denatonium Benzoate) Solution Aerosol Protocol
 - 1.4 Irritant Smoke (Stannic Chloride) Protocol

2. Quantitative
 - 2.1 Generated Aerosol
 - 2.2 Ambient Aerosol Condensation Nuclei Counter (AACNC)
 - 2.3 Modified AACNC for half-faced and full-faced respirators
 - 2.4 Modified AACNC for Filtering Facepiece Respirators
 - 2.5 Controlled Negative Pressure (CNP)
 - 2.6 CNP Redon

B. Fit Testing Requirements at UMD

Quantitative fit-testing must be conducted by ESSR for any elastomeric respirators to be worn on UMD property. Qualitative fit-testing may be conducted by the unit, after approval by ESSR, or by ESSR upon request. Fit testing must be conducted with the respirator make, model, and size of the respirator that will be used. Based on the Hazard Evaluation performed, the user will be provided an appropriate cartridge for the elastomeric respirator, and FFR most suitable for the user; or the appropriate filtering facepiece respirator. Using the protocols provided in [29 CFR 1910.134 Appendix A](#), the user is asked to perform several exercises to challenge the respirator fit. Conditions under which these protocols are used are discussed below.

1. General Fit Testing Requirements

- 1.1 Prior to fit testing, respirator users shall receive medical clearance and in-person initial respiratory protection training.
- 1.2 Additional training will be given during the respirator fit test regarding correct usage, inspection and upkeep. Fit testing must be completed before the employee has to complete job assignments that require respirator use.
- 1.3 Supervisors are responsible for ensuring employee respirator users are being fit tested annually, and shall not issue respirators to any employee who has not met the requirements outlined in this program.
- 1.4 Facial hair shall not interfere with the sealing surface of the face piece or the valve function of the respirator. Respirator users that have facial hair must be clean shaven when wearing a respirator. Clean shaven is defined by OSHA as “less than one day's growth” where the respirator seals to the face.
- 1.5 Supervisors are responsible for ensuring employee respirator users are aware that facial hair cannot interfere with the seal and function of the respirator. Please refer to the [CDC chart for guidance \(Facial Hairstyles and Filtering Facepiece Respirators\)](#).
- 1.6 Users of tight-fitting respirators shall perform a seal check each time they put on the respirator using the procedures in OSHA's Appendix B-1.

IX. Maintenance and Care

In order to ensure continuing protection from respiratory protective devices, it is necessary to establish and implement proper maintenance and care procedures and schedules. A lax attitude toward maintenance and care will negate successful selection and fit because the devices will not deliver the assumed protection unless they are kept in good working order.

A. Cleaning & disinfecting

1. Each respirator user must ensure that their respirator is clean, sanitary, and in good working order. The cleaning and disinfection using the procedures recommended by the respirator manufacturer. The RPP Administrator will ensure that the procedures are of equivalent effectiveness as Appendix B-2 of 29 CFR 1910.134.

B. Storage

1. Storage of respirators must be done properly to ensure that the equipment is protected from environmental conditions that may cause deterioration.
2. All UMD personnel must ensure that respirators are stored to protect them from:
 - 2.1. Damage
 - 2.2. Contamination
 - 2.3. Dust
 - 2.4. Sunlight
 - 2.5. Extreme temperatures
 - 2.6. Excessive moisture
 - 2.7. Damaging chemicals
3. APRs must be packed, or stored in, plastic bags to prevent deformation of the facepiece and exhalation valve.

C. Inspection

1. To assure the continued reliability of respirator equipment, it must be inspected on a regular basis. The frequency of inspection is related to the frequency of use. Table 1 below shows the respirator type and associated frequency:

| Respirator Type | Frequency of Inspection |
|--------------------------------------|---|
| All types used in routine situations | Before each use and during cleaning |
| Emergency escape-only respirators | Before being carried into the workplace for use |

2. Respirator inspections criteria
 - 2.1. Check for respirator function, tightness of connections, and the condition of the various parts including, but not limited to:
 - 2.1.1. Facepiece
 - 2.1.2. Head straps
 - 2.1.3. Valves
 - 2.1.4. Connecting tube

- 2.1.5. Elastomeric parts (e.g., straps) for pliability and signs of deterioration.
- 2.1.6. Cartridges, canisters or filters
- 2.2. For SCBAs, in addition to 2.1.1. through 2.1.5. above:
 - 2.2.1. Maintain air and oxygen cylinders in a fully charged state and recharge when the pressure falls to 90% of the manufacturer's recommended pressure level.
 - 2.2.2. Determine that the regulator and warning devices function properly.
 - 2.2.3. Ensure that exhalation valve allows air to exit mask and not enter. Regulator functions properly.
 - 2.2.4. Check condition of straps, buckles, and back plate. Low pressure hose in working condition.
 - 2.2.5. Examine cylinder pressure (PSI) is accurate and in working condition.
 - 2.2.6. Ensure that harness gauge pressure functions properly.
 - 2.2.7. Ensure that cylinder valve knob functions correctly.
 - 2.2.8. Inspect cylinder and note any flaws.
 - 2.2.9. Detect any leaks or other problems in purge valve.
 - 2.2.10. Ensure that PASS alarm is present and working.
 - 2.2.11. Maintain cylinder as fully charged.
- 2.3. In accordance with manufacturer directions, all of the following components pertinent to Ambient Air Pumps for SARs shall be inspected on a monthly basis:
 - 2.3.1. Rotary vane system
 - 2.3.2. Inlet and exhaust filter assemblies
 - 2.3.3. Pressure gauge
 - 2.3.4. Pressure relief valve
 - 2.3.5. Electric cord
- 2.4. Trained personnel shall replace worn or deteriorated parts with parts designed for the respirator.
 - 2.4.1. No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations.
 - 2.4.2. Self-contained breathing apparatus (SCBA) and

emergency escape SCBA shall be thoroughly inspected at least once a month and after each use, and a written record kept of inspection dates and findings.

- 2.5. For respirators maintained for emergency use, certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator. This information shall be maintained until replaced following a subsequent certification.
- 2.6. Respirators that fail an inspection or are otherwise not fit for use and cannot be repaired must be discarded. Any *respirators* defined by this policy that fail inspection or are seen as unfit for use must be turned into ESSR for appropriate disposition. For such conditions, contact OSH (osh@umd.edu). Any dust masks that are no longer to be used are to be thrown away.

X. Respiratory Protection Plans and Annual Self-Assessments

A. Department-Specific Respiratory Protection Plans

1. To develop a plan specific to the department, as well as to conform to the program developed for compliance with 29 CFR 1910.134, a Department-Specific Respiratory Protection Plan is included as Appendix G
2. Completion of the plan provides for the required elements that enable the department to implement and maintain compliance with the OSHA Respiratory Protection Standard.

B. Annual Self-Assessments

1. Appendix H provides an annual self-assessment checklist that includes the criteria discussed in this program. This will be used by ESSR to inspect units requiring respiratory protection and may be used as a guide for units to perform self-inspections. The Coordinator will be trained in how to conduct self-inspections.
2. The checklist criteria are those that will be used by ESSR in their annual audits.

XI. Records

- A. Medical clearances, training records, and fit testing records must all be maintained by UMD.

1. Respirator users' medical clearances must be maintained for length of employment, plus thirty years.
2. Training records must be maintained by OSH.
3. Fit testing records must be maintained until the next fit test is administered.
4. The following records are all maintained by Coordinators:
 - 4.1. SCBAs monthly inspections maintained until the next monthly inspection is completed.
 - 4.2. Emergency escape-only respirators must be inspected before being carried into the workplace for use. Records must be maintained until the next inspection is completed.
 - 4.3. Respiratory Protection Plans maintained for two years.
 - 4.3.1. Internal compliance assessments maintained for two years.

APPENDIX A - Acronyms

| | |
|--------------|--|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| AIHA | American Industrial Hygiene Association |
| ANSI | American National Standards Institute |
| APR | air-purifying respirator |
| APF | assigned protection factor |
| ASR | atmosphere-supplying respirator |
| ASTM | originally, the American Society for Testing and Materials, now ASTM International |
| CBRN | chemical, biological, radiological, and nuclear |
| CDC | Centers for Disease Control and Prevention |
| CEL | Certified Equipment List |
| CFR | Code of Federal Regulations |
| DHHS | Department of Health and Human Services |
| DHS | Department of Homeland Security |
| EPA | Environmental Protection Agency |
| ERC | Education and Research Center (NIOSH) |
| ESLI | end-of-service-life indicator |
| FFR | filtering facepiece respirator |
| HEPA | high-efficiency particulate air |
| HHE | Health Hazard Evaluation |
| MOSH | Maryland Department of Occupational Safety and Health |
| MUC | Maximum Use Concentration |
| NIOSH | National Institute for Occupational Safety and Health |
| NIST | National Institute of Standards and Technology |
| NPPTL | National Personal Protective Technology Laboratory |
| OSHA | Occupational Safety and Health Administration |
| PAPR | powered air-purifying respirator |

| | |
|--------------|--|
| PEL | Permissible Exposure Limit |
| PLHCP | physician or other licensed health care professional |
| PPE | personal protective equipment |
| RPP | respiratory protection program |
| SAR | supplied air respirator |
| SCBA | self-contained breathing apparatus |
| SDS | safety data sheet |
| SEI | Safety Equipment Institute |
| SOP | standard operating procedure |
| UL | Underwriters Laboratories |

APPENDIX B - Definitions

Aerosol - A system consisting of particles, solid or liquid, suspended in air.

Air-purifying respirator - A respirator with an air-purifying filter, cartridge or canister 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.

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 (SARs) and self-contained breathing apparatus (SCBA) units.

Canister (air purifying) - A container filled with sorbents and catalysts that remove gases and vapors from air drawn through the unit. Usually connected to the facepiece with a hose. The canister may also contain an aerosol (particulate) filter to remove particulates.

Cartridge - A small container filled with air-purifying media, attached directly to the respirator facepiece that is designed to remove gases, vapors and/or particulates.

Contaminant - A harmful, irritating or nuisance material that is foreign to the normal atmosphere.

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 respiratory contaminant.

Employee exposure - Exposure to a concentration of an respiratory contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) - A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator - A respirator intended to be used only for emergency exit.

Exhalation valve - A one-way device that permits exhaled air to be discharged from the respirator facepiece.

Exposure Limit – A limit established by the UMD department or ESSR that is used to determine the requirement for respiratory protection. This limit must always be lower than the permissible exposure limit where it applies.

Facepiece - That portion of a respirator that covers the wearer's nose, mouth and possibly eyes. It is designed to make a gas-tight or dust-tight fit with the face and includes the headbands, exhalation valve(s) and connections for an air-purifying device.

Filter - A fibrous medium used in respirators to remove solid or liquid particles from the airstream entering the respiratory enclosure. There are now three particulate filter series available for air purifying respirators;

- N100, N99 and N95 filters (99.97%, 99% and 95% efficient non-oil filters) to be used with any solid non-oil containing particulate.
- R100, R99 and R95 filters (99.97%, 99% and 95% efficient oil resistant filters) to be used for any particulate contaminant. If used for an oil containing contaminant, filter use is limited to one work shift only.
- P100, P99 and P95 filters (99.97%, 99% and 95% efficient oil proof filters) to be used for any particulate contaminant.

Filtering facepiece (dust mask) - A negative pressure particulate respirator with a filter (N95) as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor - A quantitative estimate of respirator fit which typically estimates the ratio 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.

High efficiency particulate air (HEPA) filter - Filter that is at least 99.97% efficient in removing monodispersed particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood - A respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) - An atmosphere immediately dangerous to life or health (IDLH). An IDLH atmosphere poses an immediate hazard to life, such as an oxygen deficient atmosphere (containing less than 19.5 percent oxygen), contains explosive or flammable atmospheres, and/or concentrations of toxic substances or produces an irreversible debilitating effect on health.

Loose-fitting facepiece - A respiratory inlet covering that is designed to form a partial seal with the face.

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. It 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.

National Institute for Occupational Safety and Health (NIOSH) - A federal agency that tested, approved and certified respiratory protection equipment along with MSHA under the old 30 CFR Part 11 standard. NIOSH is now the sole source of approval under the new 42 CFR Part 84 standard.

Oxygen deficient atmosphere - An atmosphere with oxygen content below 19.5% by volume.

Permissible exposure limit (PEL) - Maximum permitted airborne chemical concentrations established by OSHA, for compliance purposes, under 29 CFR 1910. The limits are normally published as denoting an 8 hour time weighted average (TWA) value but may also be designated with "C" denoting a ceiling value that is not to be exceeded.

Physician or other licensed health care professional (PLHCP) - An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows them 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.

Protection factor (PF) - The minimum anticipated protection provided by a properly functioning respirator or class of respirators to a given percentage of properly fitted and trained users.

Respirator - A device designed to protect the wearer from inhalation of harmful atmospheres.

Self-contained breathing apparatus (SCBA) - An atmosphere-supplying respirator for which the breathing air source is carried by the user.

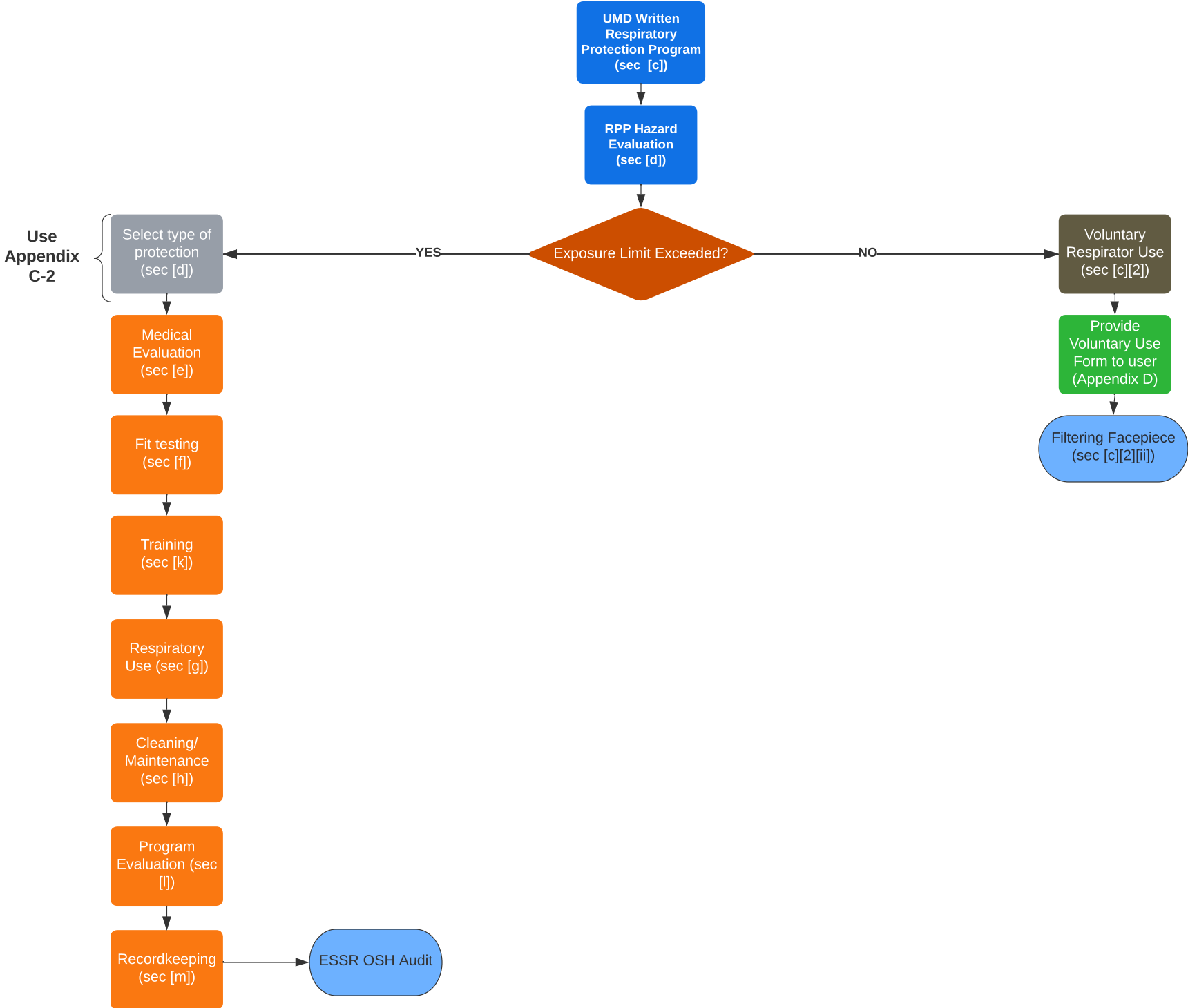
Service life - The period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator - An atmosphere-supplying respirator for which the source of breathing air is not carried by the user.

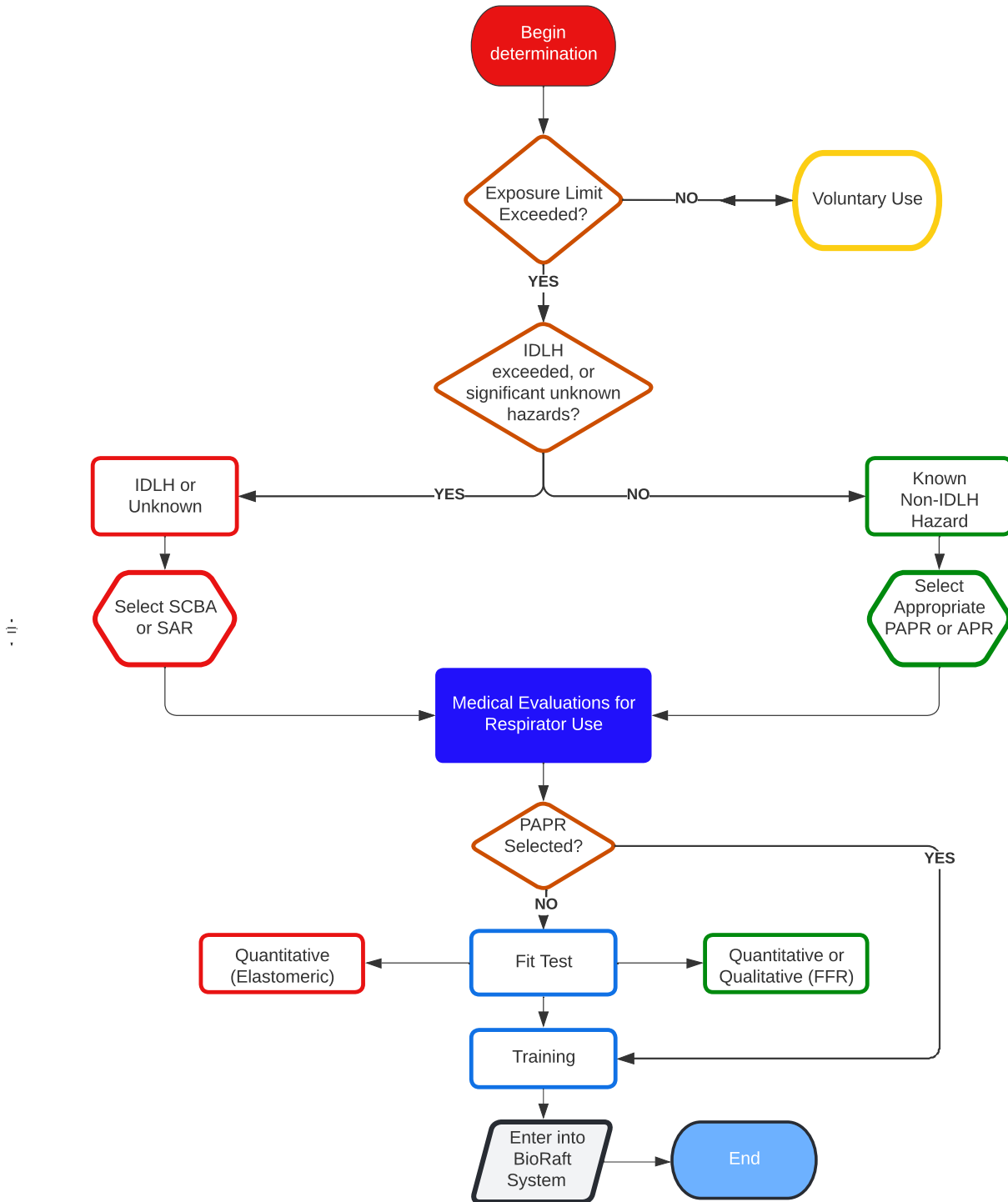
Threshold limit value (TLV) - A list published by the American Conference of Governmental Industrial Hygienists (ACGIH) as a recommended guide for exposure concentrations that a healthy individual normally can tolerate for eight hours a day, five days a week over the duration of a normal working career without harmful effects. Airborne particulate concentrations are generally listed as milligrams per cubic meter of air (mg/m^3), and gaseous concentrations are listed as parts per million (ppm) by volume.

Warning Properties - A given chemical's ability to be smelled, tasted or exhibit irritation effects at airborne concentrations below the PEL or TLV.

Appendix C-1 Respiratory Protection Plan Programmatic Elements



Appendix C-2 Respiratory Protection Decision Chart



Appendix D: Respiratory Protection Hazard Evaluation

| | | | | | |
|---|-----------------------|--------------------------|---|--------------------------|--|
| Department: | | Supervisor/PI: | | Date: | |
| Location where subject work occurs: | | | | | |
| Detailed description of the subject work: | | | | | |
| | | | | | |
| Expected level of physical effort: | | | | | |
| <input type="checkbox"/> Light/Sedentary <input type="checkbox"/> Moderate <input type="checkbox"/> Strenuous | | | | | |
| JHA/SOP Associated with subject work: | | | | | |
| <input type="checkbox"/> JHA <input type="checkbox"/> SOP <input type="checkbox"/> Neither | | | | | |
| ! Please submit copy of JHA or SOP to ESSR: mailto:osh@umd.edu | | | | | |
| Exposure to chemicals: | | | | | |
| <input type="checkbox"/> | Pesticides | <input type="checkbox"/> | Organic Vapors (e.g., benzene, toluene, ethylbenzene, xylene, MEK) | | |
| <input type="checkbox"/> | Paint Spraying | <input type="checkbox"/> | Formaldehyde/Formalin | | |
| <input type="checkbox"/> | Mercury Vapors | <input type="checkbox"/> | Ammonia | | |
| <input type="checkbox"/> | Methylene Chloride | <input type="checkbox"/> | Acid Gas (e.g., sulfur oxides, hydrogen cyanide, hydrogen sulphide) | | |
| <input type="checkbox"/> | Other (specify): | | | | |
| Approximate quantity used: | | | | Duration using material: | |
| Protocol/Procedure (include frequency of use): | | | | | |
| | | | | | |
| Exposure to dust, mist, fumes or particulates: | | | | | |
| <input type="checkbox"/> | Welding fumes | <input type="checkbox"/> | Animal dander | <input type="checkbox"/> | Pesticide |
| <input type="checkbox"/> | Lead | <input type="checkbox"/> | Wood dust | <input type="checkbox"/> | Fungicide |
| <input type="checkbox"/> | Rodenticide | | | | |
| <input type="checkbox"/> | Paint spraying | | | | |
| <input type="checkbox"/> | Nanoparticles (list): | | | | |
| <input type="checkbox"/> | Other particulates: | | | | |
| <input type="checkbox"/> | Biological hazards: | | | | |
| <input type="checkbox"/> | Other (specify): | | | | |
| Approximate quantity used: | | | | Duration using material: | |
| Protocol/Procedure (include frequency of use): | | | | | |
| | | | | | |
| Work involving any of the above-mentioned hazards is performed: | | | | | |
| <input type="checkbox"/> | Outside | <input type="checkbox"/> | In a lab (bench top) | <input type="checkbox"/> | In a confined space |
| <input type="checkbox"/> | In a mechanical room | <input type="checkbox"/> | In the animal facility | <input type="checkbox"/> | In an oxygen-deficient atmosphere ¹ |
| <input type="checkbox"/> | In a machine shop | <input type="checkbox"/> | In a spray paint room or booth | <input type="checkbox"/> | Other (specify below): |
| Description of location if other than those listed above: | | | | | |
| | | | | | |

¹ UMD personnel **may not** perform work in an oxygen-deficient atmosphere (< 19.5% oxygen). If work is conducted or proposed in an oxygen-deficient atmosphere, please contact ESSR at (301) 405 – 3960.

| Respiratory protection (type) currently in use (select all that apply): | | | |
|---|---|--------------------------|--|
| <input type="checkbox"/> | Half-face respirator | <input type="checkbox"/> | Full-face respirator |
| <input type="checkbox"/> | Chemical cartridge (black, white, bright green, yellow, magenta, olive/brown, magenta, or combination [please list below]): | | |
| <input type="checkbox"/> | PAPR | <input type="checkbox"/> | N, R, or P disposable filter mask respirator (e.g., N95, P100) |
| <input type="checkbox"/> | None | <input type="checkbox"/> | Other (specify): |

| Hazard concentration | |
|--------------------------|--|
| <input type="checkbox"/> | Unknown |
| <input type="checkbox"/> | Known (specify results of analysis below): |
| | |

| Respiratory protection (type) proposed for use (select all that apply): | | | |
|---|---|--------------------------|--|
| <input type="checkbox"/> | Half-face respirator | <input type="checkbox"/> | Full-face respirator |
| <input type="checkbox"/> | Chemical cartridge (black, white, bright green, yellow, magenta, olive/brown, magenta, or combination [please list below]): | | |
| <input type="checkbox"/> | PAPR | <input type="checkbox"/> | N, R, or P disposable filter mask respirator (e.g., N95, P100) |
| <input type="checkbox"/> | None | <input type="checkbox"/> | Other (specify): |

| Proposed Respirator Specifications | |
|------------------------------------|--|
| Manufacturer: | |
| Model Series: | |

| Describe below why using alternative controls (e.g., Engineered, Administrative) is not possible: |
|---|
| |

| Describe additional safety concerns related to procedure(s)/protocol(s) that may impact respiratory protection selection or use (e.g., additional PPE required, high temperatures, working alone, etc.): |
|--|
| |

| List personnel, UID numbers, and associated procedures (attach additional list if necessary): | | |
|---|-----|------------------------|
| Name | UID | Procedure(s) Performed |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | |
|-------------------------|--|----------------------|--|
| Signature of Supervisor | | Date of last review: | |
|-------------------------|--|----------------------|--|

*ESSR review is required for all procedures where respiratory protection is required and all use of tight-fitting air purifying respirators including those determined to be for voluntary use. Send a copy of this form to osh@umd.edu



ESSR Use Only

| | |
|--|--|
| Date of Most Recent ESSR Review | |
| ESSR Reviewer | |

| Monitoring, Sampling and Analysis: | | |
|---|--------------------|--|
| Hazardous material(s) | Summary of results | Exposure Limit (Enter N/A if non-applicable) |
| | | |
| | | |
| | | |
| Additional Notes: | | |
| | | |
| ESSR representative: | | Date: |



Appendix E: The Proper Use of Assigned Protection Factors (APFs) and Maximum Use Concentrations (MUCs)

Under the Occupational Safety and Health Administration's (OSHA) Respiratory Protection Standard ([29 CFR 1910.134](#)), APFs and MUCs are used in the proper selection of respiratory protection equipment for non-IDLH (immediately dangerous to life and health) atmospheres.

UMD RPP Safety Representatives must select respirators using Table F-1 *Assigned Protection Factors*. They also must consider MUC's before respirator selection. Selection of respirators should be based on the actual airborne contaminant level found in the workplace. Determining the actual airborne contaminant level typically requires industrial hygiene monitoring.

In addition, for the APFs and MUCs to be properly applied, all respirators must be fit-tested and used in accordance with all local and federal regulations. The APF/MUC will not be accurate for employees that are not clean shaven, have hair that interferes with the fit of a tight-fitting respirator, have a poor fitting respirator, or an improperly selected cartridge. Employees wearing tight-fitting respirators with facial hair that interferes with the fit is a common deficiency found during potent compound safety gap assessments.

What is an Assigned Protection Factor?

An APF is a term used by OSHA to determine how well a respirator/filter combination will protect an individual from external contaminants. It is an estimate of the level of protection a respirator provides. APFs are used to select the appropriate class of respirators that will provide the necessary level of protection. There are certain levels used for different types of masks. The APF is based on the type of mask and size.

An APF of 10 means that no more than one-tenth of the contaminants to which the worker is exposed will leak into the inside of the mask. An APF of 100 means only an one percent leakage.

Example: If the airborne concentration of an airborne contaminant such as the highly potent compound *Compound X* is 20 ug/m³, then a properly-fitted half-face mask with an APF of 10 would reduce the exposure inside the mask down to 2 ug/m³. A properly-fitted full-face mask with an APF of 50, would reduce the exposure inside the mask down to 0.4 ug/m³.

What is a Maximum Use Concentration?

The MUC is a term used by OSHA for the upper limit at which the class of respirators is expected to provide protection. The MUC can be calculated by multiplying the APF in Table F-1 by the permissible exposure limit (PEL), short-term exposure limit (STEL), or ceiling value of the contaminant.

$$\text{APF} \times \text{PEL} = \text{MUC}$$

If an exposure ever approaches the MUC, then the UMD Unit should select the next highest level of respirator. The respirator can be used up to this concentration as long as the MUC does not

exceed the immediately dangerous to life or health (IDLH) level. When no OSHA PEL is available for a hazardous substance, the MUC must be determined using available information and professional judgement.

Example: If the permissible exposure limit for a contaminant such as Toluene* is 200 ppm, then a half-faced mask with an APF of 10 should protect the employee up to 2,000 ppm. $10 \text{ APF} \times 200 \text{ ppm} = 2,000 \text{ ppm (MUC)}$

Caution: Since the IDLH for Toluene is 500 ppm, you cannot use an air purifying respirator. You must use positive pressure supplied air or self-contained breathing apparatus.

In order to prevent employee exposures to hazardous chemicals, engineering and administrative controls should be first applied. Then, if these controls by themselves are not sufficient enough to lower potential exposures to below the PEL then it will be necessary for the company to implement an effective respiratory protection program. Having a thorough understanding of APF and MUC concepts is critical is the proper selection of respiratory protection.

And when in doubt, always refer to the Respiratory Protection Standard 29 CFR 1910.134.

Table F-1 Assigned Protection Factors⁵

| Type of respirator ^{1,2} | Quarter mask | Half mask | Full facepiece | Helmet/hood | Loose-fitting facepiece |
|---|--------------|-----------------|----------------|----------------------|-------------------------|
| Air-Purifying Respirator | 5 | 10 ³ | 50 | ----- | ----- |
| Powered Air-Purifying Respirator (PAPR) | ----- | 50 | 1000 | 25/1000 ⁴ | 25 |
| Supplied-Air Respirator (SAR) or Airline Respirator | | | | | |
| ○ Demand mode | ----- | 10 | 50 | ----- | ----- |
| ○ Continuous flow mode | ----- | 50 | 1000 | 25/1000 ⁴ | 25 |
| ○ Pressure-demand or other positive-pressure mode | ----- | 50 | 1000 | ----- | ----- |
| Self-Contained Breathing Apparatus (SCBA) | | | | | |
| ○ Demand mode | ----- | 10 | 50 | 50 | ----- |
| ○ Pressure-demand or other positive-pressure mode | ----- | | 10,000 | 10,000 | ----- |

1. UMD decision-makers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.
2. The assigned protection factors in Table F-1 are only effective when UMD ESSR, Department Leads, Supervisors, RPP Safety Representatives, and employees implement a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.
3. This APF category includes filtering facepieces, and half masks with elastomeric facepieces.
4. The unit must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a Workplace Protection Factor (WPF) or Simulated Workplace Protective Factor (SWPF) study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.
5. These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Definitions

- **APF** - Assigned Protection Factor (APF) means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.
- **IDLH** – Immediately Dangerous to Life and Health (IDLH) is defined by the US National Institute for Occupational Safety and Health (NIOSH) as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment.
- **MUC** - Maximum Use Concentration (MUC) means 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

References

- OSHA – Assigned Protection Factors for the Revised Respiratory Protection Standard. OSHA Respiratory Protection standard – [29 CFR 1910.134](#)
- <https://www.osha.gov/sites/default/files/publications/3352-APF-respirators.pdf>

**Appendix F
University of Maryland
Qualitative Fit Test Record**

| Name of Employee | UID | Unit Supervisor | Date |
|------------------|-----|-----------------|------|
| | | | |

Type of Qualitative OSHA accepted fit test protocol used: Saccharin Bitrex Isoamyl Acetate Irritant Smoke

| Respiratory Fit Tested (Make, Model, Style, Size) | Fit Test Pass/Fail |
|---|---|
| | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| | <input type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Comments | |
| | |

Fit testing conducted in compliance with UMD Respiratory Protection Program and OSHA Standard 1910.134(F):

Name and Signature of Fit Tester: _____

Signature employee: _____

Appendix G

Site-Specific Respiratory Protection Plan

The supervisor is responsible for ensuring the information in this site-specific respiratory protection plan is completed, and updated, when necessary. Prior to completing this plan, contact ESSR for a hazard evaluation to determine if respirator use is required, and assist with respirator and filter/cartridge selection if needed.

This site-specific plan should include the following information, listed below:

- Hazard assessment (performed in partnership with ESSR personnel)
- Departmental respirator users and site-specific program information
- Respirator cleaning, maintenance, and storage procedures
- Additional relevant information and/or documentation
- Emergency respirator use – record of monthly inspection (if relevant to the program)

Modification of Site-Specific Respiratory Protection Forms

The supervisor is responsible for ensuring the above information is completed, maintained, and submitted to ESSR. Modification of these sections may be required when any of the following situations present:

- Addition or removal of employees to the respirator program
- Equipment or process additions and/or modifications
- Work practice alterations
- New inhalation hazards
- Any condition that may affect the proper use of respirator equipment

Hazard Assessment

Attach the hazard assessment to the site-specific respiratory protection plan. This will document the tasks, task frequency, air contaminants, engineering controls, and any pertinent additional information present regarding respirator use.

Respirator Users and Program Information

List the following information below:

- Employee name
- Respirator model, size, filters, and/or cartridges used
- Respirator physical date (conducted by Occupational Unit of the University Health Center)
- Initial training and/or online refresher date (note: initial training must be completed in- person at ESSR)
- Fit test date (conducted by ESSR personnel)

| Employee name and job title | Respirator model/filters/cartridges | Respirator physical date | Initial training/online refresher date | Fit test date |
|-----------------------------|-------------------------------------|--------------------------|--|---------------|
| | | | | |
| | | | | |
| | | | | |

Emergency Respirator Use – Record of Inspection

Complete this record of monthly inspection for each respirator used for emergency use in the department.

Inspection Procedure for Emergency Use Respirators

1. Straps: Headbands, fasteners, and adjusters are tight and elastic.
2. Inhalation/exhalation valves: No cracks, tears, or dirt between valve and valve seat.
3. Facepiece: Ensure it is not cut, torn, modified, deteriorated, or dirty.
4. Lens: Should not be scratched, cracked, broken, or otherwise damaged, and completely sealed around the face-piece.
5. Cartridge holders: Gaskets are in place and not cracked or damaged. Remove the gaskets to check for dirt under them.
6. Cartridges/filters: Use the cartridge appropriate for the hazard. Inspect cartridges for cleanliness, dents, scratches, or damage to the seals. Do not wash cartridges or clean with compressed air.

Record inspection information below

| | | |
|-------------------------|-------------------------|--------------------------|
| Respirator User: | Respirator make: | Respirator Model: |
| Respirator size: | Respirator ID# | Location: |

| Date | Inspector Initials | Valves inspected (Y/N) | Facepiece inspected (Y/N) | Lens inspected (Y/N) | Straps inspected (Y/N) | Action items/comments |
|-------------|---------------------------|-------------------------------|----------------------------------|-----------------------------|-------------------------------|------------------------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |

Cleaning, maintenance, and storage procedures

List respirator cleaning procedures (using procedures in OSHA's 29 CFR 1910.134 Appendix B-2, or others recommended by the manufacturer)

List respirator maintenance procedures (location of spare parts, filters, other applicable equipment and/or procedures)

List respirator storage location(s)

List any additional relevant information and/or documents pertaining to this site-specific respiratory protection program. Attach supporting documents to this plan (e.g., air monitoring results, breathing air quality test data, respirator manufacturer’s literature, fit test certifications, etc.).

Appendix H

Self-Assessment Checklist for the UMD Respiratory Protection Program

| Respirator Prerequisites/Respirator Selection | | | |
|---|------------------------------|-----------------------------|-----------------------------|
| Respiratory hazards in the workplace have been identified and evaluated. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | NA |
| Respiratory hazards requiring the use of respirators exist in the subject area. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Respirator(s) are being voluntarily worn by employee(s). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Prior to respirators being worn, the employee has completed the OSHA Medical Evaluation Questionnaire found in Appendix C to §1910.134. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Prior to respirators being worn, the employee has completed the Respiratory Protection training in accordance with § IV of the UMD Respiratory Protection Program. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Respirators are NIOSH certified, and used under the conditions of certification. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Respirators are selected based on the workplace hazards evaluated and workplace and user factors affecting respirator performance and reliability. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| For Non-IDLH atmospheres: | | | |
| <input type="checkbox"/> Air-purifying respirators used for protection against gases and vapors (e.g., PAPRs) are equipped with ESLIs or a change schedule has been implemented. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| <input type="checkbox"/> Air-purifying respirators used for protection against particulates are equipped with NIOSH-certified HEPA filters or other filters certified by NIOSH for particulate under 42 CFR part 84 (95, 97, 100 – N, R, P) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Type of respirator (make, model, size) chosen: | | | |
| Fit Testing (For loose fitting powered air purifying respirators, no fit test is required) | | | |
| Employees who are required to use tight fitting respirator face pieces have passed an appropriate fit test prior to being required to use a respirator. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| If fit-testing is conducted by the department (qualitative fit-test only), ESSR has approved the protocol in accordance with Appendix H of the UMD Respiratory Protection Program. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Fit testing is conducted with the same make, model and size that the employee will be expected to use at the worksite. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Fit tests are conducted annually. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Provisions are made to conduct additional fit tests in the event of physical changes in the employee that may affect respirator fit. ESSR is notified when this situation exists. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Provisions are made to conduct additional fit tests in the event that there is an identified need for additional make or model. ESSR is notified when this situation exists. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Proper Use of Respirators | | | |
| Employees using tight-fitting respirators have no conditions, such as facial hair, that would interfere with a face-to-face piece seal or valve function. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Appendix H

Self-Assessment Checklist for the UMD Respiratory Protection Program

| | | | |
|---|------------------------------|-----------------------------|-----------------------------|
| Employees wearing corrective glasses, goggles or other protective equipment in a manner that does not interfere with a face-to-face piece seal or valve function. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Employees perform user seal checks prior to each use of a tight-fitting respirator (as applicable). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Employees do not return to their work area until their respirator has been repaired or replaced in the event of breakthrough, a leak in the face piece, or a change in breathing resistance. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Respirator Maintenance and Care | | | |
| <i>Cleaning and Disinfecting</i> Respirators are provided that are clean, sanitary and in good working order. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Respirators are cleaned and disinfected using the procedures defined in the training module. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Respirators are cleaned and disinfected: <input type="checkbox"/> As often as necessary when issued for the exclusive use of one employee <input type="checkbox"/> Before being worn by different individuals. <input type="checkbox"/> After each use for emergency use respirators <input type="checkbox"/> After each use for respirators used for fit testing and training. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| <i>Storage</i> Respirators are stored to protect them from damage from the elements and from becoming deformed. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| <i>Inspections</i> Routine-use respirators are inspected before each use and during cleaning. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Inspections include: <input type="checkbox"/> Check of respirator function <input type="checkbox"/> Tightness of connections <input type="checkbox"/> Condition of the face piece, head straps, valves and cartridges <input type="checkbox"/> Condition of elastomeric parts | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| <i>Repairs</i> Respirators that have failed inspection are taken out of service, and repairs are performed only by approved vendors. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Only NIOSH-approved parts are used. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Change out schedules discussed. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Appendix H

Self-Assessment Checklist for the UMD Respiratory Protection Program

| Training and Information | | | |
|--|------------------------------|-----------------------------|-----------------------------|
| Employees can demonstrate knowledge of: <ul style="list-style-type: none"> <input type="checkbox"/> Why the respirator is necessary <input type="checkbox"/> How improper fit, usage or maintenance can compromise the protective effect of the respirator. <input type="checkbox"/> The limitations and capabilities of the respirator. <input type="checkbox"/> How to inspect, put on and remove, use and check the seals of the respirator. <input type="checkbox"/> The procedures for maintenance and storage of the respirator. <input type="checkbox"/> How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators. <input type="checkbox"/> The general requirements of this program and the OSHA respiratory protection standard. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Training is understandable to employees, and is provided prior to use of the respirator. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Retraining is provided: <ul style="list-style-type: none"> <input type="checkbox"/> Annually, <input type="checkbox"/> Upon changes in workplace conditions that affect respirator use. <input type="checkbox"/> Because of inadequate knowledge on the part of an employee. <input type="checkbox"/> Whenever retraining appears necessary to ensure safe respirator use. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| The Voluntary Use Form (Appendix E of the UMD program) is provided to voluntary users. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Program Evaluation | | | |
| Workplace evaluations are being conducted as necessary to ensure that the written respiratory protection program is effectively implemented. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Any problems identified during assessments are corrected. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Supervisors/managers are assessing performance and reporting to ESSR any problematic conditions. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Recordkeeping | | | |
| Records of medical evaluations have been retained (applicable to UMD UHC). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Fit testing records have been retained. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| A copy of the current respiratory protection program has been retained. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Access to these records is provided to the employees required to use respiratory protection. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Unit Safety Representative: | | | |
| Unit Safety Representative Signature: | | | |