Respirator Protection Program
Environmental Health and Safety Statement

Iowa State University strives to be a model for environmental, health and safety excellence in teaching, research, extension, and the management of its facilities. In pursuit of this goal, appropriate policies and procedures must be developed and followed to ensure this community operates in an environment free from recognized hazards. Faculty, staff, and students are responsible for compliance with established policies and are encouraged to instill practices that ensure safety, protect health, and minimize the institution’s impact on the environment.

As an institution of higher learning, Iowa State University
• fosters an understanding of and a responsibility for the environment,
• encourages individuals to be knowledgeable about environmental, health and safety issues that affect their discipline, and
• shares examples of superior environmental health and safety performance with peer institutions, the State of Iowa and the local community.

As a responsible steward of facilities and the environment, Iowa State University
• strives to provide and maintain safe working environments that minimize the risk of injury or illness to employees, students and the public,
• continuously improves operations, with the goal of meeting or exceeding required and applicable environmental, health and safety regulations, rules, policies, or voluntary standards, and
• employs innovative strategies of waste minimization and pollution prevention to reduce the use of toxic substances, promote reuse, and encourage the purchase of renewable, recyclable and recycled materials.

The intent of this statement is to promote environmental stewardship, protect health, and encourage safe work practices within the Iowa State University community. The cooperative efforts of the campus community to remain mindful of these goals will ensure that Iowa State University continues to be a great place to live, work, and learn.

Dr. Steven Leath
President
Directory of Service and Emergency Providers

Services

Environmental Health and Safety
2408 Wanda Daley Drive | (515) 294-5359

Iowa State University Occupational Medicine Department
G11 Technical and Administrative Services Facility (TASF), 2408 Pammel Drive | (515) 294-2056

McFarland Clinic PC, Occupational Medicine
1018 Duff Avenue | (515) 239-4496

Thielen Student Health Center
2647 Union Drive | (515) 294-5801

Emergency

Emergency - Ambulance, Fire, Police
911

Department of Public Safety/ Iowa State University Police
Armory, 2519 Osborn Drive | (515) 294-4428

Mary Greeley Medical Center
1111 Duff Avenue | (515) 239-2011
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A. Introduction

The prevention of occupational disease caused by breathing contaminated air should be accomplished through engineering or administrative controls. For example, general and local ventilation, isolation of a process, or substitution of a less hazardous material are all effective engineering/administrative controls that can eliminate or reduce airborne hazards. Respirators should not be used if engineering/ administrative controls are feasible. However, when these controls are not feasible, or while they are being instituted, respirator protection is an appropriate means of protecting an employee. The issuance of respirators to employees must be done as specified in this manual to ensure proper respirator selection, fitting, medical surveillance, and to meet regulatory requirements.

Purpose

The purpose of the Iowa State University Respiratory Protection Program is to:

- Provide written procedures that can be used to administer an effective respiratory protection program and prevent exposure to airborne contaminants, thus maintaining employee health.

- Outline specific information to facilitate:
  - Appropriate respirator selection.
  - Employee respirator training, fit-testing, care, and use.
  - Medical surveillance to evaluate an employee’s health and ability to wear a respirator.

- Meet the requirements of a written respiratory protection program as outlined in the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.134.

Scope

The respirator program includes all respirator types, including:

- Dust mask respirators (e.g., 3M N95 dust mask).
- Half-face chemical cartridge respirators (e.g., MSA Comfo II and 3M 7500’s series half masks).
- Full-face chemical cartridge respirators (e.g. 3M 6000’s series and MSA Ultra Twin full face masks).
- Powered-air purifying respirators (PAPR) (e.g. 3M PAPR).
- Air-line respirators (also known as supplied air respirators).
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• Self-contained breathing apparatus (SCBA) (e.g. Scott Airpack). Definitions of respirator types and related items are listed in the Definitions section.

Statement of Responsibilities

Environmental Health and Safety (EH&S)

The specific responsibility for developing and implementing Iowa State University programs for health and safety resides with Environmental Health and Safety (EH&S). In fulfillment of this responsibility, EH&S has developed the Iowa State University Respiratory Protection Program and will assist individual departments in the implementation of a respiratory protection program for their areas. Specifically, EH&S is responsible for:

Developing, implementing and auditing the Iowa State University Respiratory Protection Program.

• Assisting supervisors with hazard assessments and respirator selection.

• Providing employee respirator certification, training, fit-testing and recordkeeping.

Departments

Each university department is responsible for evaluating areas under its administrative control and determining whether employees require respiratory protection. Once it has been determined that employees need to participate in the Iowa State University Respiratory Protection Program, departmental supervisors must understand and enforce the provisions of the program. Specifically, responsibilities of departmental supervisors are to ensure that:

• Employees receive approval to wear respirators from the Occupational Medicine physician, receive training, fill out appropriate paperwork, and are fit-tested (i.e., are certified) before respirators are used.

• Approved respirators and cartridges are available, as needed.

• Proper respirators and cartridges are used, based on an employee’s job hazard assessment.

• Employee respirators are inspected, maintained, and cleaned on a regular basis.

• EH&S is contacted when questions or problems arise.
Employees

Employees are responsible for:

• Observing all practices and procedures contained in the Iowa State University Respiratory Protection Program.

• Ensuring correct respirator and cartridge combinations are used for specific jobs or tasks.

• Attending required training sessions.

• Observing all other general safety practices.

• Reporting hazardous or unsafe conditions to their supervisor(s).

Occupational Medicine

Occupational Medicine, located in G11 Technical and Administrative Services Facility (TASF), 2408 Pammel Drive is responsible for:

• Reviewing medical questionnaire information.

• Performing necessary medical tests.

• Granting approval for respirator usage.

• Retaining necessary confidential medical records.

• Notifying EH&S of potential problems reported by employees or the Occupational Medicine Physician.

Steps for Obtaining a Respirator at Iowa State University

The OSHA Respiratory Protection Standard (29 CFR 1910.134) requires medical evaluation, fit testing, and training for individuals who intend to wear respiratory protection. Iowa State University employees who are required to wear respiratory protection according to their job description or research protocol must participate in the ISU Respiratory Protection Program.

Respirator certification consists of three steps:

1. Medical Evaluation

   • Review workplace hazards with your supervisor and complete the Hazard Inventory Form. Email the completed form to EH&S.

   • Call Occupational Medicine at (515) 294-2056 to schedule a medical evaluation.
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• Complete the Medical Questionnaire for Respiratory Protective Equipment. Take the questionnaire with you to your Occupational Medicine evaluation.

• Approval to wear a respirator is granted by the Occupational Medicine physician and you will be given a Medical Approval for Respirator Use form.

2. Training and Fit Testing

• Sign up for a Respirator - Initial Certification class by calling EH&S at (515) 294-5359. Bring the Medical Approval for Respirator Use form obtained at Occupational Medicine to class.

• Respirator – Initial Certification class will include training and individual fit testing. All respirator models available at Central Stores are available for fitting at EH&S. At the successful completion of the class, EH&S will issue a Respirator Prescription, listing respirator type, size, and cartridge type.

3. Purchase Your Respirator

• Present the Respirator Prescription and a Central Stores requisition at Central Stores (192 General Services Bldg) to purchase a respirator.

Continued required use of a respirator will require you to attend Respirator Recertification class annually. EH&S will notify program participants of their recertification due date.
B. Medical Evaluation

A medical evaluation is required by OSHA’s Respiratory Protection Standard (29 CFR 1910.134) for employees who wear respirators. OSHA requires that the medical evaluation consist of, at minimum, completion of the Medical Questionnaire for Respiratory Protective Equipment by the employee and review of the questionnaire by a licensed health care professional. This requirement is intended to assure that employees are physically able to wear a respirator. As a result, any Iowa State University employee requiring a respirator must participate in Occupational Medicine Program and receive medical approval from the Occupational Medicine Physician prior to respirator use.*

Participation in the Occupational Medicine Program requires completion of a Hazard Inventory Form. The Hazard Inventory form must be completed by all employees who are exposed to biological, physical, or chemical hazards in the workplace. A new Hazard Inventory should be filled out for both new and current employees who have had changes in job hazards or work conditions.

Following receipt of the Hazard Inventory form by EH&S, personnel with workplace hazards requiring medical monitoring will be sent a questionnaire titled “Information Request.” EH&S will use this information to determine the need for enrollment in the Iowa State University Occupational Medicine Program.

Medical Review Frequency

Following National Institute of Occupational Safety and Health (NIOSH) guidelines, medical evaluations for respirator users at Iowa State University will be conducted using the following schedule:

<table>
<thead>
<tr>
<th>AGE</th>
<th>MEDICAL REVIEW FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 35 years</td>
<td>Every 5 years after baseline</td>
</tr>
<tr>
<td>35-44 years</td>
<td>Every 2 years after baseline</td>
</tr>
<tr>
<td>45 years or older</td>
<td>Every year after baseline</td>
</tr>
</tbody>
</table>

Annual medical reviews are required for all SCBA respirator users. More frequent medical reviews may be required in special cases as determined by the Occupational Medicine physician.

*An exception is voluntary dusk mask users.
C. Training and Fit-Testing

All non-voluntary respirator users at Iowa State University are required to have annual training and fit-testing. Initial and recertification classes are held each month at EH&S, 2408 Wanda Daley Drive. Employees must call (515) 294-5359 to enroll in an Initial Respirator training course. Employees needing recertification training must register through the Learn@ISU. Employees must be clean shaven to be fit tested and to wear tight fitting respirator facepieces.

Training classes will provide employees with information about:

- workplace respiratory hazards
- proper respirator and cartridge selection and use
- proper respirator fit
- respirator limitations and inspection techniques
- chemical cartridge end of service life indicators
- respirator donning
- respirator seal checks
- proper respirator maintenance (cleaning)
- proper respirator storage
D. Respirator Approval, Selection and Purchase

**Approval**

All respirators used at Iowa State University must be approved by the National Institute for Occupational Safety and Health (NIOSH) and carry the NIOSH approval label. All respirators sold by Iowa State University Central Stores carry the NIOSH approval label.

**Selection**

Proper respirator selection depends on the type of contaminant, expected airborne concentration, and other factors such as oxygen percentage. Potential inhalation hazards must be assessed before the correct respirator can be selected. EH&S will assist departments in the evaluation of job hazards and recommend the type of respirator needed.

Departmental supervisors shall ensure that proper respirators and cartridges are used, based on the employee’s job hazard assessment.

**Purchase**

A written prescription from EH&S is required for respirator/cartridge purchases at Central Stores. Prescriptions will be provided by EH&S after completion of training and fit testing or if respirator/cartridge requirements change. This will ensure that the proper respirator/cartridge is selected for the job and that the appropriate hazard assessment and training have been completed. Respirators purchased through other sources must be approved in writing by EH&S before use.

**Voluntary Dust Mask Use**

Employees who use dust mask respirators (N95) for “non-required” or “nuisance” purposes are considered voluntary users and are not required to participate in the Respiratory Protection Program. Voluntary dust mask use requires ALL of the following conditions to be true:

- Exposure to airborne contaminants is below OSHA permissible exposure limits (PELs).
- Exposure is only to non-toxic nuisance materials e.g., (plant dust, agar dust, etc.).
- There is no exposure to infectious disease agents e.g., (pathogenic E. coli, Mycobacterium tuberculosis).
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- Dust masks are not worn to reduce exposure to gases or vapors.

Dust mask users must read the Instructions for Dust Mask Respirator Users. This document is also distributed at Central Stores when dust masks are purchased. Voluntary users are still required to follow mandatory use, storage and disposal guidelines.
E. Respirator Limitations

Dust masks are limited to use with nuisance dusts only. (Users will be fit tested with a Bitrex or saccharin solution.)

Air purifying respirators (defined in Definitions section) must NOT be used in:

- Atmospheres that are oxygen deficient (< 19.5% oxygen).
- Atmospheres that are immediately dangerous to life or health (IDLH).
- Atmospheres with contaminants that cannot be removed by the respirator cartridge.
- Atmospheres that contain a contaminant whose concentration exceeds the assigned protection factor (rating) of the respirator.
- Atmospheres that contain a contaminant which has poor warning properties.

Emergency situations often require the highest level of respiratory protection. Atmospheres which have not been characterized (monitored) should be treated as though they are immediately dangerous to life and health (IDLH). Supplied-air respirators, such as the self-contained breathing apparatus (SCBA) or air-line respirator may be used in these atmospheres. However, emergency situations and IDLH entry must be handled on a case-by-case basis by EH&S. This will ensure that appropriate hazard assessments and mandatory training and fit-testing have been performed.
F. Respirator Cartridge Change-Out Schedules

The service life of a cartridge is the length of time the absorbing material in a chemical cartridge is effective in keeping contaminants out of the respirator. To ensure that chemical cartridges are replaced before the service life ends, a cartridge change-out schedule must be developed and followed. EH&S staff are available to assist departments in complying with this regulatory requirement.

Listed below are OSHA recognized rules of thumb that can be used to estimate cartridge service life:

- If a chemical’s boiling point is >70°C (158°F) and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.
- Service life is inversely proportional to work rate.
- Reducing concentration by a factor of 10 will increase the service life by a factor of 5.
- Humidity above 85% will reduce service life by 50%.

In the absence of a change-out schedule for specific operations, chemical cartridges should be changed-out at the end of each day or work shift.

High efficiency particulate air filters (HEPA) should be changed if damaged, soiled, or noticeable increased breathing resistance occurs.

Contact EH&S for information on changing HEPA filters when used against airborne oil.
G. Respirator Maintenance

Cleaning

Employees are responsible for ensuring that their respirators are used and stored in a clean condition. Disposable dust masks can be reused, but should be discarded when dirty. Alcohol wipe pads may be used on half-face, full-face and air-supplied respirators needing light cleaning.

Respirators that need thorough cleaning should be taken apart and washed in warm water with a mild commercial detergent. Cleaning products are available through Iowa State University Central Stores. After cleaning, respirators should be dried, reassembled and stored in their box or a plastic bag. Once stored, respirators must not have objects resting against them.

Any respirator that is shared must be cleaned and disinfected after each use.

Replacement Parts

All respirators should be inspected before each use and again when reassembled after cleaning. Any parts that are defective should be replaced with the manufacturer’s replacement parts. Parts can be obtained through ISU Central Stores.

SCBA Air Quality and Inspection

Compressors used to fill self-contained breathing apparatuses (SCBA) should be tested quarterly. The compressors’ air must be tested for carbon dioxide, carbon monoxide, oxygen concentration and hydrocarbon condensate. Compressor air filters should be changed per the manufacturer’s guidelines.

SCBAs should be inspected monthly. The units must be inspected for proper function and also to confirm that a minimum cylinder air capacity of 90% is maintained. Cylinders with air capacity falling below this level must be refilled.
H. Recordkeeping

**EH&S**

EH&S maintains respirator training and fit-testing records for all Iowa State University employees within the Respiratory Protection Program. These files include:

- Employee name and job title.
- Supervisor name and department.
- Anticipated respiratory hazards.
- Respirator type, manufacturer, model, and size.
- Previous certification date (training and fit-testing).
- Type of agent used in fit-testing.
- Signature of person performing fit-testing.

**Occupational Medicine**

Occupational Medicine will maintain medical records. These files include:

- Medical Questionnaire for Respiratory Protective Equipment submitted by employee/
- Pulmonary function test records.
- Other medical records used to determine approval to wear a respirator.
- Copy of medical approval record.

**Supervisors**

Supervisors of employees voluntarily using dust mask respirators should maintain a record of employees given the Instructions for Dust Mask Respirator Users.
## I. Program Evaluation

### EH&S

EH&S will periodically evaluate the Respiratory Protection Program. EH&S will ensure that:

- Written respirator procedures exist.
- Records are complete for employee fit-tests and training.
- Employees have completed a medical evaluation prior to fit-testing.
- The written program is reviewed and updated to reflect necessary changes.
- Employees are surveyed on the effectiveness of the respiratory protection program during annual training.

### Departments

Departments are responsible for ensuring that:

- Employees have been trained in respirator use.
- Employees wear the correct respirators, when needed.
- Workplace hazards have been reviewed.
- Provisions of the written Respiratory Protection Program are implemented.
- Respirators and cartridges are properly maintained.
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Definitions

Acid Gas Cartridge
A respirator cartridge offering protection against acid gases such as sulfur dioxide, hydrochloric acid, hydrogen bromide, etc. (Note: Not all acid gases are removed by this cartridge. Consult with EH&S for limitations).

Air-Line Respirator: (Type C supplied air respirator)
The air-line respirator is connected to a suitable compressed air source, which is delivered continuously or intermittently (pressure-demand). Typically, this respirator type does not filter air, but rather supplies clean air from a source outside the work area.

Air Purifying Respirator
A respirator employing filters or cartridges to remove gases, mists, and/or particles from air (as opposed to air-supplying respirators).

Dust Mask (dust/mist respirator)
A respirator that filters dusts and mists but not gases (vapors). A dust mask not rated as HEPA may not filter out small dust particles such as tobacco smoke (0.01 - 1.0 micron diameter) or insecticide dust (approximately 0.5 - 10.0 micron diameter) and cannot be used for asbestos or lead related exposures.

Full-Face Respirator
A respirator that fits over the eyes, nose and mouth, having a clear facepiece. Typically negative air purifying, but includes SCBA and air-line respirators as well.

Half-Face Respirator
An air purifying respirator that fits over the mouth and nose, but not the eyes. Typically a negative air purifying respirator.

HEPA Filter Cartridge
A respirator cartridge that offers respiratory protection against airborne particulate matter including dusts, mists, metal fumes, and smokes; but not gases, vapors, or oxygen deficiency. Many HEPA filters are rated to capture over 99% of particles 0.3 microns in diameter or larger. HEPA filters and/or cartridges are typically used for protection against airborne asbestos, lead, radionuclides and other small diameter particulate air contaminants. HEPA cartridges are color coded with a purple/pink band.

Immediately Dangerous to Life or Health - IDLH
IDLH represents the maximum air contaminant level to which a healthy individual can be exposed for 30 minutes without suffering irreversible health effects or impairing symptoms that could inhibit escape from the contaminated environment. Air purifying respirators cannot be used in atmospheres above the IDLH of a contaminant.

Negative Air-Purifying Respirator
A respirator that fits tightly against the face and relies on inhalation to bring air across filter and/or cartridges that remove air contaminants.

Organic Vapor Cartridge
A cartridge offering protection against organic gases and vapors such as hexane, naphtha, acetone, etc.
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(Note: Not all organic vapors are removed by this cartridge. Consult with EH&S for limitations).

**PAPR - Powered Air Purifying Respirator**
A PAPR uses a power source (usually a battery pack) to operate a blower that passes air across a filter, to supply purified air to a respiratory inlet.

**PEL - Permissible Exposure Limit**
An exposure limit that is published and enforced by OSHA as a legal standard. Air contaminant concentrations below a PEL allow a worker to continuously work 8 hours per day, 5 days per week, without ill effects. Work in concentrations about a PEL require respirator protection. See also **TLV**.

**Protection Factor**
The ratio of the ambient airborne concentration of a contaminant to its concentration inside the respirator. Dust masks and half-face respirators are typically rated with a protection factor of 10, thus affording a 10-fold reduction in exposure when used properly.

**SCBA - Self Contained Breathing Apparatus**
The type of respiratory protection typically used by fire fighters employing a compressed air tank and positive pressure or pressure-demand air regulators.

**TLV - Threshold Limit Value**
A time weighted average air contaminant concentration under which most people can work continuously for 8 hours a day, day after day, with no harmful effects. Unlike PEL’s, TLV’s are updated regularly by the American Conference of Governmental Industrial Hygienists (ACGIH) and reflect current “good practice” exposure limits. Though they are similar to the PEL’s enforced by OSHA, TLV’s are guidelines and are not enforceable under federal regulations.
Non-discrimination Statement

“Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3350 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515 294-7612, email eooffice@iastate.edu”