Respiratory Protection Program
Protecting the Safety, Health, and Environment of the Iowa State Community

Iowa State University strives to be a model for safety, health, and environmental excellence in teaching, research, extension, and the management of its facilities. In pursuit of this goal, appropriate policies and procedures have been developed and must be followed to ensure the Iowa State community operates in an environment free from recognized hazards. Faculty, staff, and students are responsible for following established policies and are encouraged to adopt 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 safety, health and environmental issues that affect their discipline, and
- shares examples of superior safety, health and environmental 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 faculty, staff, students, and the public,
- continuously improves operations, with the goal of meeting or exceeding safety, health and environmental regulations, rules, policies, or consensus 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 will ensure that Iowa State University continues to be a great place to live, work, and learn.

Wendy Wintersteen
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 and illness 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 or administrative controls that can eliminate or reduce airborne hazards. Respirators should not be used if engineering or 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 (ISU) 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 (3M N95 dust mask).

• Half-face cartridge respirators (MSA Comfo II and 3M 7500’s series half masks).

• Full-face cartridge respirators (3M 6000’s series and MSA Ultra Twin full face masks).

• Powered-air purifying respirators (PAPR) (3M PAPR).

• Air-line respirators (also known as supplied air respirators).

• Self-contained breathing apparatus (SCBA) (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 ISU 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 ISU 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 (are certified before respirators are used).
- Approved respirators and cartridges are available and 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 or EH&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 four steps:

1. **Hazard Inventory**

   Review workplace hazards with your supervisor and complete a Hazard Inventory.

   EH&S will review the inventory. After EH&S has processed the inventory and you will receive an email notifying you need to call the Occupational Medicine doctor’s office for a medical evaluation.

2. **Medical Evaluation**

   Call Occupational Medicine at (515) 294-2056 to schedule a medical evaluation.

   Complete the Medical Questionnaire for Respiratory Protective
Respiratory Protection Program

Equipment (PDF). Take the questionnaire with you to your Occupational Medicine evaluation.

Approval to wear a respirator is granted by the Occupational Medicine physician.

3. Training and Fit Testing

Sign up for a Respirator - Initial Certification class by calling EH&S at (515) 294-5359.

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, specifying respirator type, size and cartridge type.

4. Purchase Your Respirator

Respirators should be purchased online from Central Stores, thru ISU Workday. Fax or email the Respirator Prescription to Central Stores at 515-294-6394 or counter2@iastate.edu.

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. Sign up for Respirator Recertification.
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 medical review assures that employees are physically able to wear a respirator. As a result, any Iowa State University (ISU) employee requiring a respirator must participate in the 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 form must be completed by new employees who are exposed to hazards as part of their assigned job duties or current employees who have had changes to their hazards or personnel information. EH&S will use this information to determine the need for enrollment in the ISU Occupational Medicine Program.

If it is determined that the individual’s workplace hazards require medical monitoring or training, the individual will receive a notice from the ISU Occupational Medicine Program with further instructions. If the individual’s workplace hazards do not require any follow-up, they will not receive further communication.

Medical Review Frequency

Following National Institute of Occupational Safety and Health (NIOSH) guidelines, medical evaluations for respirator users at ISU 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 (ISU) Central Stores are NIOSH approved.

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. Environmental Health and Safety (EH&S) will assist departments in the evaluation of job hazards and select the type of respirator needed.

Departmental supervisors shall ensure that required respirators and cartridges are used, based on EH&S’s job hazard assessment.

Purchase

A written prescription from EH&S is required for respirator purchases at Central Stores. Prescriptions will be provided by EH&S after completion of training and fit testing or if respirator requirements change. This will ensure that the proper respirator 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

OSHA considers disposable, filtering face pieces (N95, dust masks) to be respirators and their use is regulated. Employees whose job description requires them to wear respiratory protection must participate in the ISU Respiratory Protection Program. Employees who voluntarily use these devices for purposes that are not part of job requirements do not need to participate when the following conditions are true:

- Exposure to airborne contaminants is below OSHA permissible exposure limits (PEL)
- Exposure is only to non-toxic nuisance materials
- Use is not required by a procedure or research protocol
- Respirators are not worn to reduce exposure to gases or vapors

Voluntary users must follow the use, storage, and disposal guidelines on the Information for Disposable Respirator Users web page.
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. 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 immediately dangerous to life or health entry must be handled on a case-by-case basis by Environmental Health and Safety (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 chemical cartridge is the length of time its absorbing material is effective at 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. Environmental Health and Safety (EH&S) is available to assist departments in complying with this regulatory requirement.

Listed below are Occupational Safety and Health Administration (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 cyBUY. 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

Environmental Health and Safety (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

Environmental Health and Safety (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
Respiratory Protection Program

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**
Immediately Dangerous to Life or Health 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 Immediately Dangerous to Life or Health 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. (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"