

Environmental Health & Safety Manual

Occupational Safety

OCCUPATIONAL SAFETY

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EYE PROTECTION POLICY

I. Purpose and Scope:

- A. The University of Wyoming (UW) is committed to reducing hazards and providing a healthful and safe workplace. This includes preventing injuries to all who work for, or visit, UW.
- B. Protective eye equipment shall be required when there is a reasonable probability of injury that can be prevented by such equipment.
- C. Substance specific standards promulgated by the Wyoming Occupational Health and Safety Administration (WOHS) may automatically require protective eyewear.

II. Introduction:

- A. Persons covered in this policy include faculty, staff, visitors, and students or other persons that may work in, study in, or inhabit UW facilities or property.
- B. Suitable eye protectors shall be provided where machines or operations present the hazard of flying objects, glare, chemicals, injurious radiation, or any combination of these hazards.
- C. Unless specifically excluded in writing by Environmental Health & Safety, shops, laboratories and other such locations are areas of reasonable probability of eye injury if protective equipment is not worn, therefore, such equipment shall be issued and worn.
- D. The respective supervisor, manager, etc. of the aforementioned areas shall make sure the protective equipment is appropriate, in good condition and worn at all times when work is in progress.
- E. Costs:
 - 1. The department for which eye protection is needed is responsible for supplying employees covered by this policy basic eye protection at no cost to the employee.
 - 2. Basic eye protection may be simple goggles or safety glasses. Prescription eyewear may be provided at the department's discretion.

If the wearer desires other types because of preference, fashion, or other, the respective department may elect to allow the cost

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difference to be made up by the wearer.

- F. Students:
1. Students at UW, whether employed by the university or not, shall abide by the requirements set forth in this policy.
 2. Costs for eye protection may be borne by the students.
 3. The respective academic department shall make sure the selected equipment is adequate and is worn at all times when hazards to the eye exist.

III. [Equipment:](#)

- A. The division, department, unit, etc. shall make conveniently available a type of protector suitable for the work to be performed, and required persons shall use such protectors.
- B. Protectors shall meet the following minimum requirements:
1. Protectors shall provide adequate protection against the particular hazards for which they are designed.
 2. Protectors shall be reasonably comfortable when worn under the designated conditions.
 3. Protectors shall fit snugly and shall not unduly interfere with the movements of the wearer.
 4. Protectors shall be durable.
 5. Protectors shall be capable of being disinfected.
 6. Protectors shall be easily cleanable.
 7. Protectors should be kept clean and in good repair.
- C. Persons whose vision requires the use of corrective lenses in spectacles, and who are required by this policy to wear eye protection, shall wear safety goggles or spectacles of one of the following types.
1. Spectacles: whose protective lenses provide optical correction.
 2. Goggles: that can be worn over corrective spectacles without disturbing the adjustment of the spectacles.

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3. Goggles: that incorporate corrective lenses mounted behind the protective lenses.
- D. Every protector shall be distinctly marked to facilitate identification of the manufacturer.
- E. When the manufacturer indicates limitations or precautions, they shall be transmitted to the user and care taken to see that such limitations and precautions are strictly observed.
- F. Design, construction, testing, and use of devices for eye protection shall be in accordance with American National Standard for Occupational and Educational Eye and Face Protection. Z87.1.
- G. Contact lenses may become contaminated with chemicals or other foreign material thus promoting injury to the eye, therefore, it is recommended that contacts not be worn in areas where protective eyewear is required.

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AIR MONITORING

I. Purpose and Scope:

- A. To achieve compliance with air contaminant standards, administrative, or engineering, or other controls must first be determined and implemented whenever feasible.
- B. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within regulatory limits.
 - 1. Permissible Exposure Limits (PEL):
 - a. Time Weighted Average (TWA) is the employee's average airborne exposure in any 8-hour work-shift of a 40-hour workweek, which shall not be exceeded.
 - b. Short Term Exposure Limit (STEL) is the employee's 15-minute time weighted average exposure, which shall not be exceeded at any time during a workday unless another time limit is specified in parenthetical notation below the limit. If another time period is specified, the time weighted average exposure over that time period shall not be exceeded at any time during the working day.
 - c. Ceiling is the employee's exposure, which shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure, which shall not be exceeded at any time over a working day.
 - 2. Action Level:

Action level is described in various substance-specific standards and is usually one half the 8-hour PEL. The attainment of action levels may require training, medical surveillance, signage, personal protective equipment or some combination thereof.
- C. Any equipment and/or technical measures used for air monitoring must be approved for each particular use by a competent industrial hygienist or other technically qualified person.

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II. [Exposure Monitoring:](#)

A. [General:](#)

1. Strict adherence shall be followed for substance specific standards and all applicable exposure monitoring shall be performed as stated.
2. Where the employer documents, using objective data, that the presence or use of chemicals in the laboratory cannot result in airborne concentrations that would cause any employee to be exposed at or above permissible exposure limits set forth by Wyoming Occupational Health and Safety (WOHS) under foreseeable conditions of use, the employer will not be required to measure employee exposure.
3. When an employee's exposure is determined from representative sampling, the measurements used shall be representative of the employee's full shift or short-term exposure, as appropriate.
4. Representative samples for each job classification in each work area shall be taken for each shift unless the employer can document with objective data that exposure levels for a given job classification are equivalent for different work shifts.

B. [Initial Monitoring:](#)

1. Employer shall identify all employees who may be exposed at or above the action level (or in the absence of an action level, the PEL) and accurately determine the exposure of each employee so identified.
2. Unless the employer chooses to measure the exposure of each employee potentially exposed to the airborne contaminant(s), the employer shall develop a representative sampling strategy and measure sufficient exposures within each job classification for each work-shift to correctly characterize and not underestimate the exposure of any employee within each exposure group.
3. The initial monitoring process shall be repeated each time there is a change in production, equipment, process, personnel, or control measure which may result in new or additional exposures.

C. [Periodic Monitoring:](#)

1. Employer shall periodically measure and accurately determine exposure

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to airborne contaminants for employees: shown by the initial monitoring to be exposed at or above the action level (or in the absence of an action level, the PEL).

2. After the initial determination of airborne contaminant exposure, additional samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees.
3. There will be no case when sampling will be at intervals greater than six months for employees whose exposures may reasonably be foreseen to exceed the action level (or in the absence of an action level, the PEL).

D. [Termination of Monitoring:](#)

1. If either the initial or the periodic monitoring statistically indicates that employee exposures are below the action level (or in the absence of an action level, the PEL), the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.
2. Additional monitoring may be necessary if there has been a change in the production, process, control equipment, personnel or work practices.

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RESPIRATORY PROTECTION PROGRAM

I. Purpose and Scope:

The procedures outlined in this policy are for employees whose duties necessitate the use of a respirator. Strict adherence to the provisions contained in this program is necessary to prevent excessive exposure to potentially hazardous airborne contaminants. If Employees are exposed to unregulated amounts of inert or nuisance dust they may be allowed to wear a single strap dust mask at their own discretion.

The Respiratory Protection Program is designed for employees who use respirators which include, but are not limited to, disposable masks, quarter-masks, half-masks, full face piece respirators, gas masks, powered-air-purifying respirators (PAPR), air-line respirators, and self-contained breathing apparatus (SCBA). The single strap dust mask is not considered a respirator and will only be allowed if the daily employee exposure is below 5 mg/m³ for the respirable fraction or 15 mg/m³ for total dust as per 29 CFR 1910.1001, Table Z-3.

II. Introduction:

In the control of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. Employee protection through the use of engineering controls, well designed work practices, the use of lower-toxicity materials, administrative controls, or some combination of these shall be emphasized before respirator usage.

Respirator use will be allowed only when it has been determined that there is no other feasible control method and it has been documented or there is reason to believe that excessive exposure will occur if respiratory protective equipment is not utilized. Optional usage will be at the discretion of the respective department. If an employee dons a respirator, whether it is required or optional, it is the responsibility of the respective department to comply with all components of the Respiratory Protection Program and bear the associated costs.

III. Training Requirements:

A. Employees shall not be required or allowed to wear a respirator until all of the components of the program have been completed in the following order: initial EHS approval, medical surveillance, classroom training, and qualitative fit test.

B. There will be a regular inspection and evaluation to determine the continued effectiveness of the program. Should this inspection demonstrate that

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adherence to the proper use and procedures of respirators is not occurring, retraining of those employees, including management, will occur.

IV. [Human Respiratory System:](#)

- A. Factors, which determine exposure, include:
 - 1. Particle size
 - 2. Water solubility
 - 3. Volatility
 - 4. Respiration rate
 - 5. Time of exposure
 - 6. Nature of air contaminant
 - 7. Defense mechanisms

V. [Types of Respirators at UW:](#)

- A. Air-purifying:
 - 1. Single strap dust mask
 - 2. Two-strap disposable half-mask
 - 3. Quarter-mask
 - 4. Half-mask
 - 5. Full face-piece
 - 6. Gas Masks
 - 7. Powered air-purifying respirators (PAPR):
 - * Considerations and limitations
 - a. Not be used in environments immediately dangerous to life and health (IDLH)
 - b. Limited to environments of sufficient oxygen (at least 19.5% oxygen)

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- c. Only to be used in environments with identified contaminants with known concentrations
- B. Air-supplying:
- 1. Air-line respirators
 - 2. Self-contained breathing apparatus (SCBA)
 - * Considerations and limitations
 - a. SCBA compressed air cylinders good for short duration (<45 minutes)
 - b. Pressure-demand SCBA only approved respirator for complete protection against toxic gases and oxygen deficiency.

VI. [Respirator Selection Process:](#)

- A. Follow the guide to selecting respirators (Figure 1).
- B. All respirators with a protection factor must have NIOSH/MSHA approval.
- C. The concentration of the contaminant shall not exceed the mask's Maximum Use Concentration (MUC). The OSHA Permissible Exposure Limit derives the MUC from the multiplication of the respirator Protection Factor (PF) PEL) for the contaminant in question ($MUC = PF \times PEL$).

<u>Respirator Type</u>	<u>Protection Factor (PF)</u>
Single strap dust mask	0
Two-strap disposable half-mask	5
Quarter-mask	10
Half-mask	10
Full face-piece	100
Gas mask	100
Powered air-purifying (PAPR)	1000
Airline respirators	1000
SCBA (pressure demand)	10000

- D. Respirators are to be supplied at no cost to the employee with each employee typically assigned their own respirator.
- E. In order to insure proper use and application, EHS is the only designated supplier of respiratory protection equipment. Optional suppliers may be added in the future.

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VII. Cartridge/Canister Selection:

- A. Air-purifying cartridge selection is based on the physical classification of the contaminant.

<u>Particulate</u>	<u>Non-Particulate</u>
Dust	Gas
Fume	Vapor
Mist	
Spray	
Smoke	

RESPIRATOR SELECTION GUIDE

- B. The universal color scheme is designed for a quick, visible identification of the cartridge/canister. The user shall refer to the wording of the label to determine the type and degree of protection the cartridge/canister will afford.

<u>Atmospheric Contaminants</u>	<u>Color Assigned</u>
Acid gases	White
Organic vapor	Black
Ammonia gas	Green
Organic vapor and acid gas	Yellow
Asbestos dust and radionuclides	Purple

- C. The cartridge/canister must be of the same make as the respirator in order to protect the NIOSH/MSHA approval.
- D. Air-purifying respirators must only be used against contaminants with adequate warning properties. Adequate warning properties indicate that the contaminant in question has an odor threshold or can be detected by taste at levels below the PEL.
- E. The following list can be used as a guide to common chemicals that require more protection than air-purifying respirators:

Acrolein	Fluorine	Nitro Compounds
Aniline	Hydrogen Cyanide	Nitrogen Oxides
Arsine	Hydrogen Selenide	Nitroglycerine
Boron Hydrides	Hydrogen Sulfide	Nitromethane
Bromine	Mercury Vapor	Nitrobenzene
Carbon Dioxide	Isocyanates	Ozone
Carbon Monoxide	MDI	Perchloroethane
Carbonyls	TDI	Phosgene

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Cyanogen	HDI	Phosphine
Dimethylaniline	Methyl Bromide	Phosphorous Trichloride
Dimethylsulfate	Methyl Chloride	Stibine
Ethylcyanide	Methyl Iodine	Sulfur Chloride
		Vinyl Chloride

F. Respirator cartridges/canisters should be changed:

1. When the “End of Service Life Indicator” (ESLI) indicates change is necessary.
2. When the cartridge/canister change schedule indicates change is necessary.
3. When breathing becomes difficult (clogged filter).
4. When contaminant odor or taste is noticed.
5. At the end of a project.

The basis for the cartridge/canister change schedule is due to many factors that reduce cartridge/canister service life. Variability exists in the following areas: Worker Exertion Level, Respirator Cartridge Variability, Temperature, Relative Humidity, and Multiple Contaminants. The change schedule supplied by the manufacturer can be considered a reliable source of information due to their experience and expertise. If a contaminant is not listed on the change schedule a mathematical model may be used to calculate cartridge/canister replacement.

VIII. [Respirator Fit Checking:](#)

- A. A negative and/or positive pressure fit check should be performed each time a negative pressure air-purifying respirator is donned.

Negative Pressure Check

1. Cover the cartridge/canister with the palm of your hand.
2. Inhale gently until the facepiece collapses slightly.
3. Hold this position for a few seconds.
4. If the facepiece remains slightly collapsed and no inward leakage is detected: then the respirator is properly fitted.

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Positive Pressure Check

1. Cover the exhalation valve with the palm of your hand.
2. Exhale gently until positive pressure builds in the facepiece (Do not blow hard as this will force leaks).
3. If no outward leakage is noted, the respirator is properly fit.

IX. [Respirator Fit Testing:](#)

- A. A validated qualitative fit test will be performed at the time of training and every six months thereafter to assure a proper fit. The type of fit test depends on the type of respirator.

<u>Type of Respirator</u>	<u>Type of Fit Test</u>
Single Strap Dust Mask	None
Two Strap Disposable Half-Mask Respirators w/ HEPA	Saccharin Test
Respirators w/ Organic Vapor	Irritant Smoke
	Isoamyl Acetate

- B. Failure to get a satisfactory seal with a given sized respirator will necessitate another size or brand of respirator.

X. [Inspection, Use, Maintenance, and Cleaning:](#)

- A. The employee is responsible for the cleanliness and maintenance of their own respirator.
- B. Respirators shall be inspected prior to and after each use. The respirator should be taken out of service or tagged if there are any signs of defects such as missing gaskets and valves, broken or stretched harness assemblies, excessively scratched facepieces, etc.
- C. Respirators should be cleaned after each use:
1. Clean per instructions provided by the manufacturer.
 2. Use a cleaner/sanitizer. Alcohol is not an acceptable sanitizer.
 3. Do not use heat to facilitate drying.
 4. Single strap dust masks can be thrown away after each use.

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XI. [Respirator Storage:](#)

- A. Respirators shall be stored in a clean area that is not likely to be contaminated by the work in progress (normally in a change room or another structurally segregated area).
- B. Respirators should be stored in sealed bags or boxes after being cleaned and dried. Do not leave respirators hanging by the harness assembly, as the harness will become distended.
- C. Materials should not be stored on top of respirators to avoid permanent deformation.

XII. [Medical Surveillance:](#)

- A. Employees should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment.
- B. A physician shall determine what health and physical conditions are pertinent.
- C. The respirator user's medical status should be reviewed periodically (for instance, annually).
- D. Records of all respiratory medical examinations become a part of the employee medical surveillance file at EHS and will be maintained in a confidential manner for a period of at least 30 years after termination.
- E. A review by a physician or a pulmonary function test will not be required if a single strap dust mask is the ONLY mask worn by the employee.

XIII. [General Rules for Respirator Usage:](#)

- A. No facial hair shall interfere with the respirator seal.
 - 1. Beards are not allowed.
 - 2. Face shall be clean-shaven at the beginning of their shift.
 - 3. Employees should notify their supervisor if any medical condition develops that could impact the ability to wear a respirator and perform the work safely.
- B. Contact lenses are not recommended when working in an environment that

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- necessitate the use of a respirator.
- C. Employees are only allowed to wear the specific type and brand of respirator for which they have received training.
- D. Respirator straps should be worn under hats or protective headgear.
- E. Keep talking to a minimum while wearing a respirator to maintain the best fit possible.
- F. Do not chew food, candy, gum, or tobacco while wearing a respirator.