

RI-16

RI-16 RESPIRATORY PROTECTION AND CONTROLS TO RESTRICT INTERNAL EXPOSURE

PURPOSE

These instructions provide guidelines for respiratory protection where respiratory hazards are involved. During the course of normal or emergency operations, some Environmental Health Services (EHS) personnel encounter various respiratory hazards. Examples of these hazards are: asbestos, volatile organic compounds, silica, lead, radioactive materials, pesticides, other harmful dusts, fogs, fumes, mists, gases, smokes, sprays or vapors. These hazards may be encountered in the course of normal or emergency operations.

Environmental Health Services personnel who may use respirators in the course of either normal or emergency operations must be physically qualified, trained, and properly fit tested. All personnel involved in routine operations of the hazardous waste facilities, asbestos coordinator personnel, radiation control personnel involved with waste operations and all Emergency Coordinators must be qualified to use a respirator. EHS employees will be provided with respirators that are applicable and suitable for the purpose intended. The respirator program has been developed to insure the safety of all individuals. The provisions of this program must be strictly adhered to in order to prevent unnecessary exposures and health effects associated with the use of respiratory protection.

The primary objective to control occupational diseases caused by breathing contaminated air is to prevent atmospheric contamination by methods such as engineering controls (for example enclosure or confinement of the operation, general and local ventilation and substitution of less toxic materials) and administrative controls (training, medical surveillance, shift rotations). When it is not practicable to apply processes or other engineering controls to control the material in air to values below those required, the use of respirators, increased monitoring and limiting intakes consistent with maintaining the intake consistent with ALARA philosophy shall be performed by one or more of the following means:

1. Control of access; or
2. Limitation of exposure times; or
3. Use of respiratory protection equipment; or
4. Other controls.

Personal protective equipment, such as respirators, is used in conjunction with engineering and administrative controls, or when effective engineering controls are not feasible, or while they are being instituted.

In order to provide a safe working environment for personnel involved in such activities, the following program has been developed. This program is specific

to CSU personnel, is based on current regulations and practice and will be periodically reviewed. Other individual work teams may have respirator programs specific for their needs. It is the intent that this program will work in harmony with other EHS work team programs.

PROGRAM ADMINISTRATOR

The overall EHS respirator program administrator will be a staff member of EHS. Individual teams may assign a responsible party that will coordinate with this EHS administrator.

DEFINITIONS

For a more complete list of definitions, refer to the OSHA 1910.134 standard.

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.

Employee exposure: exposure to a concentration of an airborne 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.

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

Fit factor: a quantitative estimate of the fit of a particular respirator to a specific individual and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

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

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

Negative pressure respirator (tight fitting): a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Physician or other licensed health care professional (PLHCP): an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required to assure an employee is capable of wearing a respirator.

Qualitative fit test (QLFT): a pass/fail fit test to assess the adequacy of a

respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT): an assessment of the adequacy of a respirator fit by numerically measuring the amount of leakage into the respirator.

Respirator: Any protective facepiece, hood or helmet that is designed to protect the wearer against a variety of harmful airborne agents. Examples of respirators are filtering facepiece (dust masks), half face respirators with cartridges, full face respirators with cartridges or canisters, powered air purifying respirators (PAPR), self-contained breathing apparatus (SCBA), hooded respirators and supplied air respirators (SAR).

Tight-fitting facepiece: a respiratory inlet covering that forms a complete seal with the face.

User seal check: means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

GENERAL SELECTION CRITERIA

Respirators shall be selected on the basis of the anticipated hazard present including the type of contaminant and the potential levels of exposure. Identification and evaluation of respiratory hazards may be done using the exposure assessment form (RF-16C) in this program or other reasonable methods. The evaluation shall include a reasonable estimate of employee exposures and an identification of the contaminant's chemical state and physical form. Where employee exposure cannot be identified nor reasonably estimated, the atmosphere shall be considered IDLH.

Only respirators with certification extended by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration will be made available for use by personnel. If equipment that has not been tested or certified by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration is used, or for which there is no schedule for testing or certification, an application for authorized use of that equipment must be submitted to the State. It must include a demonstration by testing, or a demonstration on the basis of reliable test information, that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use. The respirator shall be provided at no cost to the employee and must be used with the appropriate specific cartridges as per the manufacturers' specifications.

For certain routine operations at the hazardous waste facility, such as solvent consolidation, full-face air-purifying respirators with combination particulate filter-organic vapor-acid mist cartridges or other appropriate cartridges must be used. Specific cartridges for formaldehyde must be used when formalin is bulked.

Asbestos management personnel will use either a half-face or full-face air-purifying respirator equipped with High Efficiency Particulate Air (HEPA) filters or a full face powered air-purifying respirator (PAPR) equipped with a HEPA

filter. The type of respirator used will depend on the anticipated exposure level. Combination HEPA filter and organic vapor cartridges will be used when exposure to asbestos and solvents is anticipated such as during removal of floor tile with mastic removal.

Emergency Coordinators will be assigned individual respirators. Other respirators for EHS personnel use are available at the Hazardous Waste Pavilion. There shall be a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user. See the section on Care and Maintenance for procedures and schedules for maintenance of these unassigned respirators.

Respirator and cartridge selection for Emergency Coordinators will depend on the level of exposure anticipated, the type of contaminant present, and the functions the Coordinator may be required to perform. For certain emergencies, Self-Contained Breathing Apparatus (SCBA) may be required.

Environmental Health Services personnel will not routinely encounter areas with concentrations of gases or aerosols immediately dangerous to life or health (IDLH). However, in such an event, an SCBA must be used. All individuals who may be called on to use an SCBA must have attended the 40-hour OSHA hazardous waste worker course or have equivalent qualifications, and must attend a monthly training session.

Respiratory protection should be used by respirator fit trained individuals in the following situations:

- In areas known to have contaminant levels requiring the use of respiratory protection or in which contaminant levels requiring the use of respiratory protection may be created without warning (e.g., emergency purposes such as hazardous material spill responses).
- While performing operations documented to be health hazardous and those unavoidably required to be in the immediate vicinity where similar levels of contaminants are generated.
- In suspect areas or performing operations suspected of being health hazardous but for which adequate sampling data has not been obtained.
- Asbestos clean up
- Exposure to Volatile Organic Compounds', formaldehyde, solvents, thinners, or degreasers
- Any work which generates large amounts of dust
- Working in a confined space
- Exposure to fire/smoke hazard
- Exposure to volatile radionuclides not associated with a fire situation.

RF-16A gives some assistance in respirator selection and use.

Air-Purifying Respirator

These respirators remove air contaminants by filtering, absorbing, adsorbing, or chemical reaction with the contaminants as they pass through the

respirator canister or cartridge. This respirator is to be used only where adequate oxygen (19.5 to 23.5 percent by volume is available). Surgical masks do not provide protection against air contaminants. They are never to be used in place of an air-purifying respirator. They are for medical use only. Air-purifying respirators can be classified as follows:

- Particulate removing respirators, which filter out dusts, fibers, fumes and mists. However, many mists can quickly vaporize, thus requiring chemical filtering rather than particulate filtering. These respirators may be single-use disposable respirators or respirators with replaceable filters. These can be found in the emergency response bags, emergency response vehicle, and the hazardous waste pavilion.
- Gas and vapor removing respirators, which remove specific individual contaminants or a combination of contaminants by absorption, adsorption or by catalyst reaction. In contrast to filters, which are effective to some degree no matter what the particulate, the cartridges and canisters used for vapor and gas removal are designed for protection against specific contaminants. Gas masks and chemical-cartridge respirators are examples of gas and vapor-removing respirators. These can be found in the emergency response bags, emergency response vehicle, and hazardous waste pavilion.
- Combination particulate/gas and vapor removing respirators, which combine the respirator characteristics of both kinds of air-purifying respirators. These can be found in the emergency response bags, emergency response vehicle, and hazardous waste pavilion.

Atmosphere-Supplying Respirators (ASR)

These respirators provide breathing air independent of the environment. Such respirators are to be used when the contaminant has insufficient odor, taste or irritating warning properties or when the contaminant is of such high concentration or toxicity that an air-purifying respirator is inadequate. Supplied-air respirators (SAR) and Self-Contained Breathing Apparatus (SCBA) are the two basic classes of ASR's and are classified as follows:

- Demand - This respirator supplies air to the user on demand (inhalation), which creates a negative pressure within the facepiece. Leakage into the facepiece may occur if there is a poor seal between the respirator and the user's face.
- Pressure-Demand - This respirator maintains a continuous positive pressure within the facepiece, thus preventing leakage into the facepiece.
- Continuous Flow - This respirator maintains a continuous flow of air through the facepiece and prevents leakage into the facepiece.

Self-Contained Breathing Apparatus (SCBA)

This type of respirator allows the user complete independence from a fixed source of air and offers the greatest degree of protection but is also the most complex. Training and practice in its use and maintenance is essential. This type of

device will be used in emergency situations only.

EXPOSURE ASSESSMENTS

Individual work teams are to identify and evaluate respiratory hazards that employees may be exposed to, including a reasonable estimate of exposure and identification of the chemical's state and physical form. Bioassays and air sampling, as appropriate, to evaluate actual intakes may also be implemented for locations where there is a potential for conditions above the PEL or DAC. Bioassays and air monitoring will be outlined in the Standard Operating Procedures for the specified facility or work procedure.

The respirator user should be alert to changing environmental conditions so that he/she can leave the area if necessary or make changes in the level of respiratory protection. If conditions are such that there is a potential for an IDLH environment the area must be monitored. Air purifying respirators do not provide sufficient protection in low oxygen or other IDLH atmospheres.

Monitoring for contaminants must be conducted at the discretion of the work team leader but sampling must be sufficient to identify the potential hazard, permit proper equipment selection, medical surveillance, training and estimate exposures.

Since air-purifying respirators (APR) filter ambient air, the following conditions must be met so that an APR can be worn:

- (1) Atmospheric oxygen levels are above 19.5 percent,
- (2) Chemical substance is known,
- (3) Chemical substance must be able to be filtered, absorbed, or neutralized,
- (4) Chemical substance can be detected inside the mask through odor or other warning properties at concentrations less than the exposure limit,
- (5) Airborne concentration of chemical substance does not exceed the maximum use limit of the respirator and/or cartridge,
- (6) Airborne concentrations of chemical substance does not exceed the established IDLH.

If the environment does not meet these criteria, a self-contained breathing apparatus (SCBA), or supplied-airline respirator (SAR) must be used.

NIOSH and OSHA define an oxygen-deficient atmosphere (IDLH) as any atmosphere containing oxygen at a concentration below 19.5 percent at sea level. This provides an adequate amount of oxygen for most work assignments and includes a safety factor, as oxygen-deficient atmospheres offer little warning of the danger.

Breathing oxygen concentrations below 16 percent at sea level can decrease mental effectiveness, visual acuity, and muscular coordination. At oxygen concentrations below 10 percent, loss of consciousness may occur, and below 6 percent oxygen, death will result. Often only mild subjective changes are noted by

individuals exposed to low concentrations of oxygen, and collapse can occur without warning.

Asbestos exposure monitoring will be performed whenever an employee's exposure may reasonably be foreseen to exceed the Permissible Exposure Limit for occupational exposure of 0.1 fibers per cc, 8 hour time weighted average or an excursion limit of 1 fiber per cc in 30 minutes. Asbestos abatement worker exposure monitoring is performed daily during an asbestos abatement project and is a good indicator of personnel exposure while in that regulated area. These personnel visits are usually brief in nature, which makes the use of abatement worker exposure a more reliable measurement.

Respirators for use in areas where biohazards are used or stored must be selected based on a review of the laboratory procedures, protocols, biohazardous agents proposed for use, etc. The Biosafety Officer, EHS, will conduct a risk assessment and determine the appropriate Biosafety Level for the laboratory and the corresponding level of personal protective equipment required.

When estimating exposure of individuals to airborne radioactive materials, allowance for respiratory protection equipment used to limit intakes will be used, provided that the following conditions, in addition to those in RH 4.24.1, are satisfied:

- Respiratory protection equipment is selected that provides a protection factor, specified in RF-16F, greater than the multiple by which peak concentrations of airborne radioactive materials in the working area are expected to exceed the values specified in Appendix B, Table I, Column 3 in Part 4 Rules and Regulations Pertaining to Radiation Control. However, if the selection of respiratory protection equipment with a protection factor greater than the peak concentration is inconsistent with the goal specified of keeping the total effective dose equivalent ALARA, respiratory protection equipment may be selected with a lower protection factor provided that such a selection would result in a total effective dose equivalent that is ALARA. The concentration of radioactive material in the air that is inhaled when respirators are worn may be initially estimated by dividing the average concentration in air, during each period of uninterrupted use, by the protection factor. If the exposure is later found to be greater than initially estimated, the corrected value shall be used; if the exposure is later found to be less than initially estimated, the corrected value may be used.

Authorization from the State shall be obtained before assigning respiratory protection factors in excess of those specified in RF-16F. The State may authorize higher protection use factors on receipt of an application that:

1. Describes the situation for which a need exists for higher protection factors, and
2. Demonstrates that the respiratory protection equipment provides these higher protection factors under the proposed conditions of use.

For each exposure assessment, an Exposure Assessment Form (RF-16C) will be completed and kept on file.

FIT TEST CRITERIA

All individuals expected to use respiratory protection will be fit tested for the appropriate tight-fitting facepiece air-purifying respirator the first time it is worn. The test method will generally be quantitative fit testing (QNFT). The results of the fit test (RF-16E) will be kept on file in the employee's personnel file located in EHS. QNFT will be performed annually or when a different respirator facepiece (size, style, model or make) is used. Personnel must successfully pass the fit test before being issued an air-purifying respirator.

No emergency responder is permitted to wear a negative-pressure respirator in a work situation until he or she has demonstrated that an acceptable fit can be obtained. Fit testing will be conducted by EHS and the test results will be the determining factor in selecting the type, model, and size of negative-pressure respirator for use by each individual respirator wearer.

An additional fit test will be done whenever the employee reports, or the supervisor, or program administrator makes visual observations of changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

The QNFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. In other words, if the QNFT is used to fit full-face negative pressure respirators, that respirator may be used only in atmospheres less than 10X the PEL (DAC) for the contaminant.

Each individual is required to perform a user seal check each time the respirator is used. It is up to the individual to notify the program administrator or supervisor that the fit of the respirator is unacceptable. The employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

USE OF RESPIRATORS

Employees who have facial hair that comes between the sealing surface of the facepiece and the face, or that interferes with valve function or any condition that interferes with the face-to-facepiece seal or valve function shall not wear tight-fitting facepieces.

If an employee wears corrective glasses or goggles or other personal protective equipment, such equipment shall be worn in a manner that does not interfere with the seal of the facepiece. Spectacle attachment kits shall be provided for full facepiece respirators. Contact lenses should never be worn under any circumstance. In air-supplied respirators the incoming air directed toward the eye can cause discomfort from dirt, lint, or other debris lodging between the contact

lens and the cornea. If a facepiece seal is broken for any reason, irritating or toxic vapors or gases may enter the mask and be trapped under the contact lenses. Such hazardous materials may also react with the mucus membrane of the eye creating caustic by-products resulting in acute or permanent injury.

Should an employee experience a rash or skin allergy to the respirator, alternative protection or work duties will be assigned.

The respirator user should be alert to changing environmental conditions so that he/she can leave the area if necessary or make changes in the level of respiratory protection.

Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress by the immediate supervisor or, in the case of an emergency response, the designated Emergency Coordinator. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the supervisor shall reevaluate the continued effectiveness of the respirator.

Monitoring for contaminants in a hazardous waste facility must be conducted at the discretion of the hazardous waste coordinator.

CARE AND MAINTENANCE OF RESPIRATORS

For assigned equipment, each individual is responsible for inspection, cleaning and routine maintenance of his/her own respirator as often as necessary to be maintained in a sanitary condition. This consists of checking the respirator prior to use and during cleaning. This inspection must include examining the integrity and condition of the facepiece, straps, inhalation and exhalation valves, gaskets, speaking diaphragms, etc. Worn or defective parts must be replaced. No respirator with a known defect is suitable for use. No attempt should be made to replace components, make adjustments or make repairs on any respirator beyond those recommended by the manufacturer. Under no circumstances will parts be substituted, as such substitutions will invalidate the approval of the respirator. Either the manufacturer or a qualified trained technician will conduct any repair to reducing or admission valves, regulators, or alarms. Respirators must be cleaned and properly stored by the user after each use.

Individuals using EHS respirators not specifically assigned to them are also responsible for inspecting the respirator as described above.

Respirators must be cleaned by first totally dismantling all parts. Discard or repair any defective parts. Wash in warm water (temperature should not exceed 120F) with a mild detergent or with a cleaner recommended by the manufacturer. Following washing, the respirator must be thoroughly rinsed with clean warm water (43 deg. C [110 deg. F] maximum).

When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

- (1) Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at

- 43 deg. C (110 deg. F); or,
- (2) Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F); or,
 - (3) Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed. Components should be hand-dried with a clean lint-free cloth or air-dried. Reassemble facepiece, replacing filters, cartridges and canisters where necessary. Test the respirator to ensure that all components work properly.

Respirators must be stored, fully assembled except for cartridges, in a plastic or mesh bag in such a way as to prevent distortion of the face piece. Respirators for general use are stored in the Hazardous Waste Building. Individual users assigned respirators may store them in a clean area, preferably the individual user's locker in the change area, in the office or in an emergency response kit.

CARTRIDGE SELECTION AND REPLACEMENT

Respirator cartridges and canisters are designed to protect against individual or a combination of potentially hazardous atmospheric contaminants, and are specifically labeled and color-coded to indicate the type and nature of protection they provide. RF-16B gives cartridge charts and color-coding for North, MSA, and Scott brands.

The NIOSH approval label on the respirator will also specify the maximum concentration of contaminant(s) for which the cartridge canister is approved. For example, a label may read:

"DO NOT WEAR IN ATMOSPHERES IMMEDIATELY DANGEROUS TO LIFE. MUST BE USED IN AREAS CONTAINING AT LEAST 20 PERCENT OXYGEN. DO NOT WEAR IN ATMOSPHERES CONTAINING MORE THAN ONE-TENTH PERCENT ORGANIC VAPORS BY VOLUME. REFER TO COMPLETE LABEL ON RESPIRATOR OR CARTRIDGE CONTAINER FOR ASSEMBLY, MAINTENANCE AND USE."

Cartridges must be replaced when breakthrough is suspected (i.e. detectable odors), when the ESLI indicates breakthrough, or when increased cartridge resistance is noted.

Individual work teams may establish a schedule based on reasonably anticipated cartridge loading. The information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data shall be described in the individual work team program.

ATMOSPHERE SUPPLYING RESPIRATORS

Atmosphere supplying respirators will normally be used in IDLH situations, when contamination levels are unknown and/or when oxygen levels are below 19.5%. A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes will be made available. Only those EHS Emergency Responders that have met the medical and training requirements may don the SCBA. SCBAs are located in the emergency response vehicle and in the Hazardous Waste Facility. The hazardous waste coordinator is responsible for the maintenance and care of these SCBAs.

MEDICAL REQUIREMENTS

Respirator use may place a physiological burden on employees that vary with the type of respirator worn, the job and workplace conditions in which the respirator is used and the medical status of the employee.

A medical evaluation is required prior to the fit test or use of a respirator. A physician or other licensed health care professional (PLHCP) using the medical questionnaire (RF-16D) or an initial medical examination that obtains the same information as the medical questionnaire shall perform the medical evaluation.

All emergency coordinators, permanent hazardous waste workers, and asbestos coordinator personnel will undergo an annual physical examination. Graduate students or hourly employees in the hazardous waste program will receive a pre-employment physical.

Follow-up medical examinations are required for employees who give a positive response to any question among questions 1 through 8 in Section 2, Part A or whose initial medical examination demonstrates the need for a follow-up medical examination. The follow-up medical examination shall include any medical tests, consultations or diagnostic procedures that the PLHCP deems necessary to make a final determination. Pulmonary function tests are only required if the PLHCP deems them necessary. The PLHCP shall be provided information on the type and weight of the respirator, frequency of use, types of work conditions, and a copy of this written program. All required physical examinations and associated tests will be performed at EHS's or the employing department's expense. Results of these examinations will be kept in the individual's personnel file.

Exception may be made to the requirement for a physical examination if the individual has received an equivalent medical examination for work outside CSU in the six months prior to work. Such exception will be at the discretion of the Director of Environmental Health Services with the consent of the physician. Results of the previous examination must be made available to EHS.

A termination of employment examination shall be made available for all personnel within thirty calendar days before or after the date of termination of employment.

TRAINING REQUIREMENTS

Respirator training is required of all personnel who use respirators. This training will cover the nature and degree of the respiratory hazard, respirator selection, proper use and care of respirators (cleaning, maintenance, storage replacement), proper donning of the equipment, techniques for respirator fit testing including hand's-on practice (positive and negative pressure tests), methods for determining when filters and cartridges need to be replaced, protection factors, and limitations of each type of respirator. Training is given only upon successful completion of the medical evaluation.

All Hazardous Waste and Asbestos Coordinator personnel as well as all Emergency Coordinators are required to have respirator training prior to or during initial assignment to work in these programs. Respirator training will be conducted during the 24-hour or 40-hour OSHA Hazardous Waste Worker Training, Emergency Coordinator training, or during specific training for Asbestos work. In addition, on-the-job training during the initial assignment in these areas will include respirator training and quantitative fit testing. Training and fit testing may also be conducted on an individual basis at the time the respirator is first required. Emergency Coordinators will be required to train on a yearly basis using the SCBAs.

Training will recur annually and more often if necessary. Emergency Coordinators will have annual retraining on respirators as part of the 8 hour "Hazwoper" refresher course. A passing score of 80% on the Respirator Quiz (RF-16G) is required to complete the respirator training.

Respirator training will be properly documented (RF-16E) and will include the type and model of respirator for which the individual has been trained and fit-tested.

VOLUNTARY USE OF RESPIRATORS

Should an EHS employee request a respirator where respirator use is not required, EHS may provide a respirator if such use will not in itself create a hazard.

PROGRAM REVIEW

The program administrator shall be responsible for periodic review of the program. Changes or deficiencies shall be brought to the attention of the EHS Director for approval.

RF-16A RESPIRATOR SELECTION AND USE

HAZARD	RESPIRATOR TYPE
Asbestos	<p>Half-mask, air-purifying respirator with HEPA filters</p> <p>Full-face, air-purifying respirator with HEPA filters</p> <p>Full-face, powered air-purifying respirator with HEPA filters</p>
Epoxy- or Oil-based Paints	<p>Half-face, air-purifying respirators with organic vapor filters</p> <p>Full-face powered air-purifying respirator with organic vapor filters</p>
Lead-based Paint removal	<p>Half-face, air-purifying respirators with HEPA filters</p> <p>Full-face, air-purifying respirators with HEPA filters</p> <p>Full-face, powered air-purifying respirators with HEPA filters</p>
Exposure to Pesticides, Herbicides, and Rodenticides	<p>Full-face, air-purifying respirator with combination particulate and pesticide cartridges</p> <p>Full-face, powered air-purifying respirator with combination particulate and pesticide cartridges</p>
Exposure to Volatile Organic Compounds (VOC's)	<p>Full-face, air-purifying respirator with organic vapor or specific contaminant cartridges</p> <p>Full-face, powered air-purifying respirator with organic vapor or specific contaminant cartridges</p> <p>Type C supplied air respirator with pressure- demand mode</p>
Exposure to Volatile Radioactive Material	<p>Full-face, air-purifying respirator with combination filter specific to the chemical constituent and activated charcoal. Type C supplied air respirator with pressure-demand mode</p>

RF-16B CARTRIDGE COLOR CODING

MSA:

• GME Super Cartridge	Olive green
• Organic Vapors Cartridge	Black
• Acid Gases/Organic Vapors Cartridge	Yellow
• Acid Gases Cartridge	White
• Ammonia/Methylamine Cartridge	Green
• Formaldehyde Cartridge	Olive green
• Mercury Vapor/Chlorine Cartridge	Orange
• P100* Filter	Purple
• GME Super Cartridge/P100 Filter	Purple/Olive green
• Organic Vapors Cartridge/P100 Filter	Purple/Black
• Organic Vapors/ Acid Gases Cartridge/P100 Filter	Purple/Yellow
• Acid Gases Cartridge/P100 Filter	Purple/White
• Ammonia/Methylamine Cartridge/P100 Filter	Purple/Green

NORTH:

• Defender Cartridge	Olive green
• Organic Vapors Cartridge	Black
• Organic Vapors/ Acid Gases Cartridge	Yellow
• Acid Gases Cartridge	White
• Ammonia/Methylamine Cartridge	Green
• Formaldehyde or Organic Vapors	Olive green
• Mercury Vapor/Chlorine Cartridge	Olive green
• P100 Filter	Purple
• P100 Pancake Filter/Prefilter (disk type)	Purple
• Defender Cartridge/P100 Filter	Purple/Olive green
• Organic Vapors Cartridge/P100 Filter	Purple/Black
• Organic Vapors/ Acid Gases Cartridge/P100 Filter	Purple/Yellow
• Acid Gases Cartridge/P100 Filter	Purple/White
• Ammonia/Methylamine Cartridge/P100 Filter	Purple/Green
• Formaldehyde or Organic Vapors/P100 Filter	Purple/Olive green
• Mercury Vapor/Chlorine Cartridge/P100 Filter	Purple/Olive green

SCOTT:

• Multi-Contaminant Cartridge	Olive green
• Organic Vapors Cartridge	Black
• Organic Vapors/ Acid Gases Cartridge	Yellow
• Acid Gases Cartridge	White
• Ammonia/Methylamine Cartridge	Green
• P100 Filter	Purple
• Organic Vapors Cartridge/P100 Filter	Purple/Black
• Organic Vapors/ Acid Gases Cartridge/P100 Filter	Purple/Yellow
• Acid Gases Cartridge/P100 Filter	Purple/White
• Ammonia/Methylamine Cartridge/P100 Filter	Purple/Green
• Chlorine/P100 Filter Cartridge	Purple/White

N = Not Resistant to oil, P = Oil proof, R = Resistant to oil. 95 is 95% efficient for particles, 99 is 99% efficient for particles and 100 is 99.97 resistant or HEPA rated.

RF-16C EXPOSURE ASSESSMENT FORM

(Please type or print legibly)

Environmental Health Services Colorado State University

WORK TEAM: _____

JOB DESCRIPTION: _____

Contaminant: individual compounds or classes of compounds: e.g. acids, bases, VOCs, carcinogens, radioactive material(s)...

Frequency of contact: daily, weekly, monthly, occasional, etc.

Level of exposure/Concentration Level (ppm, mg/cubic meter, or $\mu\text{Ci/ml}$, % of DAC):

Method(s) of determining:

Recommended Respiratory Protection:

First Choice:

Second Choice:

Standards/Regulations governing contaminant:

RF-16D Respirator Medical Evaluation Questionnaire

(Please type or print legibly)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. The following information must be provided by every employee who has been selected to use any type of respirator (please print).

- 1) Today's date: _____
- 2) Last name: _____ First Name: _____ MI: _____
- 3) Your age (to nearest year): _____ Sex (circle one): Male/Female
- 4) Your height: _____ ft. _____ in. Your weight: _____ lbs.
- 5) Your job title: _____
- 6) A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
- 7) The best time to phone you at this number: _____
- 8) Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
- 9) Check the type of respirator you will use (you can check more than one category):
 - a) N, R, or P disposable respirator (filter-mask, non- cartridge type only).
 - b) Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
- 10) Have you worn a respirator before (circle one): Yes/No
 - a) If "yes," what type(s): _____

Part A. Section 2. Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

- 1) Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: Yes/No

- 2) Have you *ever had* any of the following conditions?
 - a) Seizures (fits): Yes/No
 - b) Diabetes (sugar disease): Yes/No
 - c) Allergic reactions that interfere with your breathing: Yes/No
 - d) Claustrophobia (fear of closed-in places): Yes/No
 - e) Trouble smelling odors: Yes/No

- 3) Have you *ever had* any of the following pulmonary or lung problems?
 - a) Asbestosis: Yes/No
 - b) Asthma: Yes/No
 - c) Chronic bronchitis: Yes/No
 - d) Emphysema: Yes/No
 - e) Pneumonia: Yes/No
 - f) Tuberculosis: Yes/No
 - g) Silicosis: Yes/No
 - h) Pneumothorax (collapsed lung): Yes/No
 - i) Lung cancer: Yes/No
 - j) Broken ribs: Yes/No
 - k) Any chest injuries or surgeries: Yes/No
 - l) Any other lung problem that you've been told about: Yes/No

- 4) Do you *currently* have any of the following symptoms of pulmonary or lung illness?
 - a) Shortness of breath: Yes/No
 - b) Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
 - c) Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
 - d) Have to stop for breath when walking at your own pace on level ground: Yes/No
 - e) Shortness of breath when washing or dressing yourself: Yes/No
 - f) Shortness of breath that interferes with your job: Yes/No
 - g) Coughing that produces phlegm (thick sputum): Yes/No
 - h) Coughing that wakes you early in the morning: Yes/No
 - i) Coughing that occurs mostly when you are lying down: Yes/No
 - j) Coughing up blood in the last month: Yes/No
 - k) Wheezing: Yes/No
 - l) Wheezing that interferes with your job: Yes/No
 - m) Chest pain when you breathe deeply: Yes/No
 - n) Any other symptoms that you think may be related to lung problems: Yes/No

- 5) Have you *ever had* any of the following cardiovascular or heart problems?
 - a) Heart attack: Yes/No
 - b) Stroke: Yes/No
 - c) Angina: Yes/No
 - d) Heart failure: Yes/No
 - e) Swelling in your legs or feet (not caused by walking): Yes/No
 - f) Heart arrhythmia (heart beating irregularly): Yes/No
 - g) High blood pressure: Yes/No
 - h) Any other heart problem that you've been told about: Yes/No

- 6) Have you *ever had* any of the following cardiovascular or heart symptoms?
 - a) Frequent pain or tightness in your chest: Yes/No
 - b) Pain or tightness in your chest during physical activity: Yes/No

- c) Pain or tightness in your chest that interferes with your job: Yes/No
 - d) In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
 - e) Heartburn or indigestion that is not related to eating: Yes/ No
 - f) Any other symptoms that you think may be related to heart or circulation problems: Yes/No
- 7) Do you *currently* take medication for any of the following problems?
- a) Breathing or lung problems: Yes/No
 - b) Heart trouble: Yes/No
 - c) Blood pressure: Yes/No
 - d) Seizures (fits): Yes/No
- 8) If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the following space and go to question 9:) _____
- a) Eye irritation: Yes/No
 - b) Skin allergies or rashes: Yes/No
 - c) Anxiety: Yes/No
 - d) General weakness or fatigue: Yes/No
 - e) Any other problem that interferes with your use of a respirator: Yes/No
- 9) Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

- 10) Have you *ever lost* vision in either eye (temporarily or permanently): Yes/No
- 11) Do you *currently* have any of the following vision problems?
- a) Wear contact lenses: Yes/No
 - b) Wear glasses: Yes/No
 - c) Color blind: Yes/No
 - d) Any other eye or vision problem: Yes/No
- 12) Have you *ever had* an injury to your ears, including a broken ear drum: Yes/No
- 13) Do you *currently* have any of the following hearing problems?
- a) Difficulty hearing: Yes/No
 - b) Wear a hearing aid: Yes/No
 - c) Any other hearing or ear problem: Yes/No
- 14) Have you *ever had* a back injury: Yes/No
- 15) Do you *currently* have any of the following musculoskeletal problems?
- a) Weakness in any of your arms, hands, legs, or feet: Yes/No
 - b) Back pain: Yes/No
 - c) Difficulty fully moving your arms and legs: Yes/No
 - d) Pain or stiffness when you lean forward or backward at the waist: Yes/No
 - e) Difficulty fully moving your head up or down: Yes/No
 - f) Difficulty fully moving your head side to side: Yes/No
 - g) Difficulty bending at your knees: Yes/No
 - h) Difficulty squatting to the ground: Yes/No

- i) Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
- j) Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

- 1) In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No
 - a) If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

- 2) At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No
 - a) If "yes," name the chemicals if you know them: _____

- 3) Have you ever worked with any of the materials, or under any of the conditions, listed below:
 - a) Asbestos: Yes/No
 - b) Silica (e.g., in sandblasting): Yes/No
 - c) Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
 - d) Beryllium: Yes/No
 - e) Aluminum: Yes/No
 - f) Coal (for example, mining): Yes/No
 - g) Iron: Yes/No
 - h) Tin: Yes/No
 - i) Dusty environments: Yes/No
 - j) Any other hazardous exposures: Yes/No
 - i) If "yes," describe these exposures: _____

- 4) List any second jobs or side businesses you have: _____

- 5) List your previous occupations: _____

- 6) List your current and previous hobbies: _____

- 7) Have you been in the military services? Yes/No
 - a) If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes/No

- 8) Have you ever worked on a HAZMAT team? Yes/No

- 9) Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No
 - a) If "yes," name the medications if you know them: _____

- 10) Will you be using any of the following items with your respirator(s)?
- a) HEPA Filters: Yes/No
 - b) Canisters (for example, gas masks): Yes/No
 - c) Cartridges: Yes/No
- 11) How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:
- a) Escape only (no rescue): Yes/No
 - b) Emergency rescue only: Yes/No
 - c) Less than 5 hours *per week*: Yes/No
 - d) Less than 2 hours *per day*: Yes/No
 - e) 2 to 4 hours per day: Yes/No
 - f) Over 4 hours per day: Yes/No
- 12) During the period you are using the respirator(s), is your work effort:
- a) *Light* (less than 200 kcal per hour): Yes/No
 - i) If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of a light work effort are *sitting* while writing, typing, drafting, or performing light assembly work; or *standing* while operating a drill press (1-3 lbs.) or controlling machines.
 - b) *Moderate* (200 to 350 kcal per hour): Yes/No
 - i) If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of moderate work effort are *sitting* while nailing or filing; *driving* a truck or bus in urban traffic; *standing* while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; *walking* on a level surface about 2 mph or down a 5-degree grade about 3 mph; or *pushing* a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.
 - c) *Heavy* (above 350 kcal per hour): Yes/No
 - i) If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of heavy work are *lifting* a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; *shoveling*; *standing* while bricklaying or chipping castings; *walking* up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).
- 13) Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No
- a) If "yes," describe this protective clothing and/or equipment: _____

- 14) Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No
- 15) Will you be working under humid conditions: Yes/No
- 16) Describe the work you'll be doing while you're using your respirator(s): _____

- 17) Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases): _____

- 18) Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):
- a) Name of the first toxic substance: _____
 - b) Estimated maximum exposure level per shift: _____
 - c) Duration of exposure per shift: _____
 - d) Name of the second toxic substance: _____
 - e) Estimated maximum exposure level per shift: _____
 - f) Duration of exposure per shift: _____
 - g) Name of the third toxic substance: _____
 - h) Estimated maximum exposure level per shift: _____
 - i) Duration of exposure per shift: _____
 - j) The name of any other toxic substances that you'll be exposed to while using your respirator: _____

- 19) Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security): _____

RF-16E RESPIRATOR FIT TEST AND TRAINING RECORD

(Please type or print legibly)

Name: _____ Date: _____

ID Number: _____ Dept. Name: _____

Fit Test

Respirator type, Manufacturer, Size and approval number.	Test Method and Agent	Results
--	-----------------------	---------

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments: _____

Tested by: _____ Date: _____
(Signature)

Subject: _____ Date: _____
(Signature)

Respirator Training Record:

Type of Training	Date of Completion	Instr.
_____	_____	_____
_____	_____	_____

I, the undersigned, verify that the above information is true, and that I understand the inherent limitations regarding the use of respirators. I have read the Respirator Program and will abide by all of its provisions.

(Signature)

(Date)

RF-16F RESPIRATOR PROTECTION FACTORS⁽¹⁾

Protection Factors⁽⁴⁾ Tested & Certified Equipment

Description ⁽²⁾	Modes ⁽³⁾	Particulates Only	Particulates, gases, vapors ⁽⁵⁾	National Institute for Occupational Safety and Health & Mine Safety and Health Administration tests for permissibility
I. AIR-PURIFYING RESPIRATORS⁽⁶⁾				
Facepiece, half-mask ⁽⁷⁾	NP	10		30 CFR 11, Subpart K.
Facepiece, full	NP	50		
Facepiece, half-mask, full, or hood	PP	1000		
II. ATMOSPHERE-SUPPLYING RESPIRATORS				
1. Air-line respirator				
Facepiece, half-mask	CF		1000	
Facepiece, half-mask	D		(5)	
Facepiece, full	CF		2000	
Facepiece, full	D		(5)	30 CFR 11, Subpart J.
Facepiece, full	PD		2000	
Hood	CF		(8)	
Suit	CF		(9)	(10)
2. Self-contained breathing apparatus (SCBA)				
Facepiece, full	D		50	
Facepiece, full	PD		10,000 ⁽¹¹⁾	30 CFR 11, Subpart H.
Facepiece, full	RD		50	
Facepiece, full	RP		5,000 ⁽¹²⁾	
III. COMBINATION RESPIRATORS				
Any combination of air-purifying and atmosphere-supplying respirators	Protection factor for type and mode of operation as listed above			30 CFR 11, Sec. 11.63(b).

See next page for footnotes.

FOOTNOTES

1. For use in the selection of respiratory protective equipment to be used only where the contaminants have been identified and the concentrations, or possible concentrations, are known.
2. Only for shaven faces and where nothing interferes with the seal of tight-fitting facepieces against the skin. Hoods and suits are excepted.
3. The mode symbols are defined as follows:
 - CF = continuous flow
 - D = demand
 - NP = negative pressure, that is, negative phase during inhalation
 - PD = pressure demand, that is, always positive pressure
 - PP = positive pressure
 - RD = demand, recirculating or closed circuit
 - RP = pressure demand, recirculating or closed circuit
4. a. The protection factor is a measure of the degree of protection afforded by a respirator, defined as the ratio of the concentration of airborne radioactive material outside the respiratory protective equipment to that inside the equipment, usually inside the facepiece, under conditions of use. It is applied to the ambient airborne concentration to estimate the concentrations inhaled by the wearer according to the following formula:
$$\text{Concentration inhaled} = \frac{\text{Ambient airborne concentration}}{\text{Protection factor}}$$
 - b. The protection factors apply:
 - (i) Only for individuals trained in using respirators and wearing properly fitted respirators that are used and maintained under supervision in a well-planned respiratory protective program.
 - (ii) For air-purifying respirators only when high efficiency particulate filters, above 99.97% removal efficiency by thermally generated 0.3 μm dioctyl phthalate (DOP) test or equivalent, are used in atmospheres not deficient in oxygen and not containing radioactive gas or vapor respiratory hazards.
 - (iii) No adjustment is to be made for the use of sorbents against radioactive material in the form of gases or vapors.
 - (iv) For atmosphere-supplying respirators only when supplied with adequate respirable air. Respirable air shall be provided of the quality and quantity required in accordance with the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration certification described in 30 CFR 11. Oxygen and air shall not be used in the same apparatus.
5. Excluding radioactive contaminants that present an absorption or submersion hazard. For tritium oxide, approximately one-third of the intake occurs by absorption through the skin so that an overall protection factor of less than 2 is appropriate when atmosphere-supplying respirators are used to protect against tritium oxide. If the protection factor for respiratory protective equipment is 5, the effective protection factor for tritium is about 1.4; with protection factors of 10, the effective factor for tritium oxide is about 1.7; and with protection factors of 100 or more, the effective factor for tritium oxide is about 1.9. Air-purifying respirators are not suitable for protection against tritium oxide. See also footnote 9 concerning supplied-air suits.
6. Canisters and cartridges shall not be used beyond service-life limitations.
7. Under-chin type only. This type of respirator is not satisfactory for use where it might be possible, such as if an accident or emergency were to occur, for the ambient airborne concentrations to reach instantaneous values greater than 10 times the pertinent values in Table I, Column 3 of Appendix B of

Part 4. This type of respirator is not suitable for protection against plutonium or other high-toxicity materials. The mask is to be tested for fit prior to use each time it is donned.

8. a. Equipment shall be operated in a manner that ensures that proper air flow-rates are maintained. A protection factor of no more than 1000 may be utilized for tested-and-certified supplied-air hoods when a minimum air flow of 6 cubic feet per minute (0.17 m³/min) is maintained and calibrated air line pressure gauges or flow measuring devices are used. A protection factor of up to 2000 may be used for tested and certified hoods only when the air flow is maintained at the manufacturer's recommended maximum rate for the equipment. This rate is greater than 6 cubic feet per minute (0.17 m³/min) and calibrated air line pressure gauges or flow measuring devices are used.

b. The design of the supplied-air hood or helmet, with a minimum flow of 6 cubic feet per minute (0.17 m³/min) of air, may determine its overall efficiency and the protection it provides. For example, some hoods aspirate contaminated air into the breathing zone when the wearer works with hands-over-head. This aspiration may be overcome if a short cape-like extension to the hood is worn under a coat or overalls. Other limitations specified by the approval agency shall be considered before using a hood in certain types of atmospheres. See footnote 9.
9. Appropriate protection factors shall be determined, taking into account the design of the suit and its permeability to the contaminant under conditions of use. There shall be a standby rescue person equipped with a respirator or other apparatus appropriate for the potential hazards and communications equipment whenever supplied-air suits are used.
10. No approval schedules are currently available for this equipment. Equipment is to be evaluated by testing or on the basis of reliable test information.
11. This type of respirator may provide greater protection and be used as an emergency device in unknown concentrations for protection against inhalation hazards. External radiation hazards and other limitations to permitted exposure, such as skin absorption, must be taken into account in such circumstances.
12. Quantitative fit testing shall be performed on each individual, and no more than 0.02% leakage is allowed with this type of apparatus. Perceptible outward leakage of gas from this or any positive pressure self-contained breathing apparatus is unacceptable because service life will be reduced substantially. Special training in the use of this type of apparatus shall be provided to the wearer.

Note 1: Protection factors for respirators approved by the U.S. Bureau of Mines and the National Institute for Occupational Safety and Health, according to applicable approvals for respirators for type and mode of use to protect against airborne radionuclides, may be used to the extent that they do not exceed the protection factors listed in this table. The protection factors listed in this table may not be appropriate to circumstances where chemical or other respiratory hazards exist in addition to radioactive hazards. The selection and use of respirators for such circumstances should take into account applicable approvals of the U.S. Bureau of Mines and the National Institute for Occupational Safety and Health.

Note 2: Radioactive contaminants, for which the concentration values in Table I, Column 3 of Appendix B of Part 4 are based on internal dose due to inhalation, may present external exposure hazards at higher concentrations. Under these circumstances, limitations on occupancy may have to be governed by external dose limits.

RF-16G RESPIRATOR QUIZ

Last Name: _____ First Name: _____

ID: _____ Department: _____

1. Which type of respirator includes a filtering mechanism that removes contaminants from the air that you breathe?
 - Air-purifying respirator
 - Airline respirator
 - Supplied-air respirator
 - Self-contained breathing apparatus
2. Which type of respirator provides clean breathing air from a tank or remote source?
 - Air-purifying respirator
 - Dust mask
 - Supplied-air respirator
 - Half-mask cartridge respirator
3. An employee works in an area with an oxygen-deficient atmosphere. What type of respirator can this person use?
 - Airline
 - Dust mask
 - Air-purifying
 - Powered air-purifying
4. The exposure assessment determines:
 - Airborne contaminants present
 - Level of exposure
 - People exposed to the contaminant
 - All of the above
5. Who must have medical clearance to use a respirator?
 - New employee
 - Transferred employee from another respirator use area
 - Supervisor
 - All respirator users
6. When should the medical clearance exam take place?
 - Before the employee begins working in the respirator use area
 - After the employee begins working in the respirator use area
 - Before fit testing and working in the respirator work area
 - After fit testing
7. Which type of fit testing uses irritant smoke or Bitrex?
 - Qualitative
 - Quantitative
 - Positive pressure
 - Negative pressure

8. Quantitative fit testing is conducted for half mask respirators when a fit factor of at least _____ is required?
- 10
 - 100
 - 1,000
 - 10,000
9. Positive-pressure and negative-pressure leak checking is required when?
- Annually
 - Once a month
 - Once a week
 - Before each use
10. Respirators used routinely must be inspected how often?
- After each use
 - Weekly
 - Monthly
 - Annually
11. When respirators are shared, they must be cleaned how often?
- After each use
 - Weekly
 - Monthly
 - Annually
12. You wear an air-purifying with cartridges to protect you from organic vapors. The cartridges must be changed out:
- Never
 - After you have smelled an odor for at least two hours
 - When they look dirty
 - On a regular schedule determined by you Respirator Program Manager
13. You do not need to be medically cleared and fit tested if you voluntarily use what type of respirator?
- SCBA
 - PAPR
 - Dust Mask
 - Airline
14. An oxygen deficient atmosphere in which a supplied-air respirator must be worn is one in which the oxygen concentration is
- Below 15%
 - Below 19.5%
 - Below 21%
 - Below 23.5%
15. Before you or your employer can select an appropriate respirator for a given environment, what must occur?
- Leak test
 - Fit test
 - Exposure assessment
 - Medical exam