



Southern Global Safety Services Inc. Written Respiratory Protection Program

Company Policy

To ensure that all Southern Global Safety Services, Inc., hereinafter referred to as (SGSS), employees are protected against airborne contaminants in their work areas and that all SGSS employees are trained in the proper care, selection, and use of respiratory protection a **Written Respirator Protection Program** has been established. This program is intended to implement the requirements of 29 CFR 1910.134 and State Respiratory Protection regulations, ANSI Z88.2-1980, and provisions of the state and federal standards requiring additional or special consideration such as asbestos, acrylonitrile, lead, arsenic, and others. The objective of this program is to comply with both the spirit and intent of federal and state regulations and provide to SGSS employees a ready and usable reference.

This program sets forth policy, information, and guidance on the care, selection, and use of respirators for all divisions and subsidiaries of SGSS. This written program will be available in SGSS corporate office, each SSGS regional office and in each long-term field offices.

This program was designed to assist various personnel whose duties and responsibilities may have them engaged in work practices and work sites where respiratory protection is required or desired. Such personnel may include but are not limited to:

- Asbestos Removal Workers and Supervisors
- Lead Abatement Workers and Supervisors
- Employees assigned to Underground Storage Tank Removals
- Employees assigned to Hazardous Waste Operations
- Employees entering Confined Spaces
- Other exposures as determined, project to project

Other personnel such as office clerks and sales representatives will not be required to participate in the program unless unusual circumstances dictate that their health would be impaired without the use of respirators.

The program excludes respirators used as: (1) underwater breathing devices (SCUBA), (2) aircraft hypobaric supplied air systems, (3) military chemical protective systems, (4) medical devices - i.e. surgical masks, and (5) research devices.

Respiratory Program

The respirator is a simple but effective tool that aids in minimizing exposures encountered in the work place. Like any tool it has its proper usage and its limitations. Respirators are not designed for everybody under all industrial contingencies. There are essentially two types of respirators which are commonly worn by SGSS employees:

1. Air purifying respirators which are used to "purify" the air to safe levels by having breathing air inhaled through "filter" cartridges. These cartridges, though, are completely ineffective against some toxins (methylene chloride and methanol, for instance). They also deteriorate over time, by resistance, and by other toxins in the air.
2. Air supplying respirators supply breathable air or oxygen from a safe source area, i.e. a compressor, or compressed gas cylinder. Generally, they are designed so that workers may enter into a more toxic, dangerous environment. Limitations of these devices occur due to limitations of supply of breathable air. Training in the use of supplied air respirators is necessary for a safe working environment.

The respirator should be considered the last line of defense. Most federal safety and health regulations mandate that engineering and administrative controls be utilized to reduce employee exposures to safe levels before respirators are required. When respirators are necessary to protect the employee, SGSS will provide applicable and suitable respiratory protection. The employee is required to use the provided respiratory protection in accordance with the instructions and training received. The employee shall guard against damage to the respirator and shall report respirator malfunctions, or inadequacies to their supervisor or to the respirator program administrators. Each employee shall determine or solicit from competent authority potential exposures prior to visiting a hazardous work site, and shall carry proper respiratory protection.

The following pertains to the SGSS respiratory protection Program.

1. Standard Operating Procedures. SGSS employees will follow the standard operating procedures for the use, selection, and care of respirators as outlined in appendix A.
2. Program Administration. The Director of Environmental Health and Safety shall administer the program. The functional authority for the

respiratory program is delegated to a person trained in the selection, use, and care of respirators, known as the Respirator Program Coordinator. The Director of Environmental Health and Safety shall have the responsibility:

- To see that all of the requirements of the respiratory program are met.
- To assure medical examinations and respirator fit tests are conducted before respirators are issued.
- To assure each employee is trained and informed of the respiratory program.
- To advise management of unusual problems, malfunctions, and health alerts.
- To review the program annually.
- To assure that records of fit tests, calibration tests of qualitative and quantitative fit test equipment, and airborne tests to ascertain respiratory protection are maintained.

The responsibilities of the respiratory program coordinator shall be as follows:

- Recommend purchase of appropriate types and numbers of respirators. Ensure that at least two or more models are available for employee selection.
- Control of the respirator inventory, spare parts, cleaning equipment, new equipment ready for reissue after cleaning/maintenance.
- Aid the SGSS employee in selecting the proper size and type for use.
- Provide training for SGSS employees in the proper use.
- Provide guidance to personnel to prevent the use of respirators by SGSS personnel who have identified limitations.
- Conduct an annual inventory and prepare an evaluation of the programs deficiencies and recommendations to the Vice President of Environmental Health and Safety.

- Supervise qualitative and quantitative fit tests to personnel as required for specific standards or specific equipment.
 - Confer with manufacturers and NIOSH about equipment functions and anomalies.
 - The cleaning and repair of respirators for non-routine use, classroom instructing, and respirators not issued permanently to SGSS employees - i.e., emergency escape, SCBA's, gas mask, PAPR's.
 - Routine inspection of self-contained breathing apparatus and emergency escape apparatus at least monthly. Criteria for evaluation will depend upon the specific type.
3. Physiological and Psychological Limitations for Respirator Wearer. The Medical Surveillance questionnaire to be completed by SGSS employee and physician which alludes to the increased impairment of health caused by respirator usage. There are questions and evaluations that cover physiological and psychological limitations. The physician and program administrators will determine if employees can use a respirator.
 4. Approved Respirators. All respirators currently SGSS inventory and those available for purchase are approved by NIOSH/MSHA. Only NIOSH/MSHA approved reporters and their parts may be used..
 5. Respirator Selection. The selection of the proper type of respirator shall be based upon (1) the nature of the hazardous operation or process, (2) the type of respiratory hazard (including physical properties, physiological effects on the body, concentration of toxic material or airborne radioactivity level, established permissible time-weighted average concentration for toxic material, established permissible airborne concentration for radioactive material, and established immediately dangerous to life or health concentration for toxic material), (3) the location of the hazardous area in relation to the nearest area having respirable air, (4) the period of time for which respiratory protection must be provided, (5) the activities of workers in the hazardous area, (6) the physical characteristics and functional capabilities and limitation of the various types of respirators, and (7) respirator protection factors.
 6. Training. Each respirator wearer shall be given training which shall include explanations and discussions of (1) the respiratory hazard and what happens if the respirator is not used properly, (2) the engineering and administrative controls being used and the need for respirators to provide protection, (3) the reason for selecting a particular type of

respirator, (4) the function, capabilities, and limitations of the selected respirator, (5) the method of donning the respirator and checking its fit and operation, (6) the proper wearing of the respirator, (7) respirator maintenance, and (8) recognizing and handling emergency situations.

7. **Respirator Fit.** Each employee that is given a respirator shall be properly fitted for that respirator. Each respirator wearer shall be required to check the seal of the respirator by appropriate means prior to entering a harmful atmosphere.
8. **Facial Hair, Contact Lenses, and Eye and Face Protective Devices.** A respirator equipped with a facepiece shall not be worn if facial hair comes between the sealing periphery of the facepiece and the face or if facial hair interferes with valve function. The wearer of a respirator equipped with a full facepiece, helmet, hood, or suit shall not be allowed to wear contact lenses. If a spectacle, goggle, face shield, or welding helmet must be worn with a facepiece, it shall be worn so as not to adversely affect the seal of the facepiece to the face.
9. **Issue of Respirators.** The proper type of respirator for each respiratory hazard shall be listed in written standard operating procedures. Only persons trained to ensure that proper respirators are issued shall be permitted to issue respirators to persons needing them.
10. **Respirator Inspection.** The respirator shall be inspected by the wearer prior to its use to ensure that it is in proper working condition. Each respirator stored for emergency or rescue use shall be inspected at least once a month.
11. **Monitoring Respirator Use.** Supervisory personnel shall periodically monitor the use of respirators to ensure that they are worn properly.
12. **Monitoring Respiratory Hazards.** The airborne concentration of the respiratory hazard in the work area shall be monitored initially prior to respirator selection and periodically during respirator use to ensure that the proper type of respirator is being utilized.
13. **Medical and Bioassay Surveillance.** When applicable, medical surveillance, including bioassay, shall be carried out periodically to determine if respirator wearers are receiving adequate respiratory protection. A physician shall determine the requirements of the surveillance program.
14. **Respirator Maintenance.** Respirator maintenance shall be performed regularly. Maintenance shall be carried out on a schedule which ensures that each respirator wearer is provided with a respirator that is clean and

in good operating condition. Maintenance shall include: (1) washing, sanitizing, rinsing, and drying, (2) inspection for defects, (3) replacement of worn or deteriorated parts, (4) repair if necessary, and (5) storage to protect against dust, sunlight, excessive heat, extreme cold, excessive moisture, damaging chemicals, and physical damage.

15. Respirator Program Evaluation. An appraisal of the effectiveness of the respirator program shall be carried out at least annually. Action shall be taken to correct deficiencies found in the program.

Finally, employees should be aware that inhalation of toxins are but one route in which toxins may enter and damage the body. Many toxins are ingested and many still are absorbed through the skin. The unprotected eye can absorb some vaporous toxins faster than it is possible to breath them. As a consequence, employees are advised to consider all personal protective equipment in addition to respirators before entering a hazardous environment.

We expect that no SGSS employee who uses respirators and other personal protective devices will do so without understanding its rationale and limitations.

Classification of Respiratory Hazard

There are various types of respiratory hazards that may be encountered in the workplace. Generally, respiratory hazards are classified as follows:

1. Oxygen deficiency
 - Immediately dangerous to life or health (IDLH).
 - Not immediately dangerous to life or health.
2. Gas and vapor contaminants
 - Immediately dangerous to life or health (IDLH).
 - Not immediately dangerous to life or health.
3. Particulate contaminants (aerosols including dust, fog, fume, mist, smoke, and spray)
 - Immediately dangerous to life or health (IDLH).
 - Not immediately dangerous to life or health.
4. Combination of gas, vapor, and particulate contaminants
 - Immediately dangerous to life or health (IDLH).
 - Not immediately dangerous to life or health.

The respiratory hazard according to their biological effect are listed in table 1.

Table 1

Oxygen Deficiency	Gas and Vapor Contaminants	Particulate Contaminates
<p>Minimum legal requirement: 19.5% by volume for respirable air at sea level conditions.</p> <p>Occurrence: Confined or unventilated cellars, wills, mines, ship hold, burning buildings, and enclosures containing inert atmospheres.</p> <p>Physiological Effects: 16 to 12% - loss of peripheral vision, increased breathing volume, accelerated heartbeat, impaired attention and thinking, impaired coordination. 12 to 10% - very faulty judgment, very poor muscular coordination, muscular exertion causes fatigue that may cause permanent heart damage, intermittent respiration. 10 to 6% nausea, vomiting, inability to perform vigorous movement, unconsciousness followed by death. Less than 6% spasmodic breathing, convulsive movements, death in minutes.</p>	<p>Asphyxiates: Interfere with utilization of oxygen in the body.</p> <p>Simple asphyxiates: Physio-logically inert substances that dilute oxygen in the air.</p> <p>Chemical asphyxiates: Low concentrations interfere with supply or utilization of oxygen in the body.</p> <p>Irritants: Corrosive in action. May cause irritation and inflammation of parts of the respiratory system and pulmonary edema.</p> <p>Anesthetics: Cause loss of feeling and sensation with unconsciousness and death possible. Some anesthetics injure body organs.</p> <p>Sensitizes: Cause increased probability of physiological reactions.</p> <p>Systemic poisons: Damage organs and systems in the body.</p> <p>Carcinogens: Produce cancer in some individuals after a latent period.</p>	<p>Relatively inert: May cause discomfort and minor irritation, but generally without injury at reasonable concentrations.</p> <p>Pulmonary-fibrosis-producing: Produce nod-ulation and fibrosis in the lung, possibly leading to complications.</p> <p>Carcinogens: Produce cancer in some individuals after latent period.</p> <p>Chemical irritants: Produce irritation, inflammation, and ulceration in upper respiratory tract.</p> <p>Systemic poisons: Produce pathologic reactions in various systems of the body.</p> <p>Allergy-producing: Produce reaction such as itching sneezing, and asthma's.</p> <p>Febrile-reaction-producing: Produce chills follower by fever.</p>

Alert: Substances that do not react with other substances under most conditions, but create a respiratory hazard by displacing air and producing oxygen deficiency.

Acidic: Substances that are acids or that react with water to produce an acid. In water, they produce positively charged hydrogen ions and a pH of less than 7. They taste sour, and many are corrosive to tissues.

Alkaline: Substances that are alkalis or that react with water to produce and alkali. In, water they result in the production of negatively charged hydroxyl ions and a pH greater than 7. They taste bitter, and many are corrosive to tissues.

Organic: The compounds of carbon. Examples are saturated hydrocarbons, unsaturated hydrocarbons, aldehydes, ketones, organic acids, amides, nitriles, amines, epoxies, and aromatics.

Organometallic: Compounds in which metals are chemically bonded to organic groups.

Hydrides: Compounds in which hydrogen is chemically bonded to metals and certain other elements.

Particles are produced by mechanical means by disintegration processes such as grinding, crushing, drilling, blasting, and spraying; or by physiochemical reaction such as combustion vaporization, distillation, sublimation, calcination, and condensation. Particles are classified as follows:

Dust: A solid, mechanically produced particle with sizes varying from submicroscopic to visible or macroscopic.

Spray: A liquid, mechanically produced particle with sizes generally in the visible or macroscopic range.

Fume: A solid condensation particle of extremely small particle size, generally less than one micrometer in diameter.

Mist: A liquid condensation particle with sizes ranging from submicroscopic to visible or macroscopic.

Fog: A mist of sufficient concentration to perceptibly obscure vision.

Smoke: A system which include the products of combustion, pyrolysis, or chemical reaction of substance in the form of visible and invisible solid and liquid particles and gaseous products in air. Smoke is usually of sufficient concentration to perceptibly obscure vision.

Director of Environmental Safety and Health, Superintendents, Estimators, Foremen are responsible for estimating or requiring subordinates to estimate potential respiratory hazard prior to inspections or emergency responses. Judgment based on past experience, consultation with clients, monitoring results, resource documents, provide the most plausible assessment. Estimates shall be empirically assessed by instruments if at all possible.

Classification, Description, and Limitations of Respirators

There are three classifications of respiratory devices:

Atmosphere Supplying Respirators

- Self Contained
- Supplied Air
- Combination Self-Contained and Supplied Air

Air Purifying Respirators

- Gas and Vapor
- Particulate (aerosols, dust, fog, fumes, mist, smoke)
- Combination Gas, Vapor, Particulate

Combination Atmosphere-Supplying and Air Purifying Respirators

More detailed information on specific types of respirators can be obtained from respirator manufacturers.

Air-Purifying Respirators

General limitations: Air-purifying respirators do not protect against oxygen-deficient atmospheres nor against skin irritations by, or sorption through the skin of, airborne contaminants.

The maximum contaminant concentration against which an air-purifying respirator will protect is determined by the design efficiency and capacity of the cartridge, canister, or filter and the facepiece-to-face seal on the user. For gases and vapors, the maximum concentration for which the air-purifying element is designed is specified by the manufacturer or is listed on labels of cartridges and canisters.

Non-powered air-purifying respirators will not provide the maximum design protection specified unless the facepiece or mouthpiece/nose clamp is carefully fitted to wearer's face to prevent inward leakage. The time period over which protection is provided is dependent on canister, cartridge, or filter type; concentration of contaminant; humidity levels in the ambient atmosphere; and the wearer's respiratory rate.

The proper type of canister, cartridge, or filter must be selected for the particular atmosphere and conditions. Non-powered air-purifying respirators may cause discomfort due to a noticeable resistance to inhalation. This problem is minimized in powered respirators. Respirator facepieces present special problems to individuals required to wear prescription lenses. These devices do have the advantage of being small, light, and simple in operation.

Use of air-purifying respirators in atmospheres immediately dangerous to life or health is limited to specific devices under specified conditions.

General information concerning types of air-purifying respirators:

(1) Full Facepiece Respirator.

Provides protection against eye irritation in addition to respiratory protection.

(2) Quarter-Mask and Half-Mask Facepiece Respirator.

A fabric covering (facelet) available from some manufacturers shall not be used.

(3) Mouthpiece Respirator.

Shall be used only for escape applications. Mouth breathing prevents detection of contaminant by odor. Nose clamp must be securely in place to prevent nasal breathing.

A small lightweight device that can be donned quickly.

Vapor and Gas-Removing Respirators

Limitations: No protection is provided against particulate contaminants. A rise in canister or cartridge temperature indicates that a gas or vapor is being removed from the inspired air.

An uncomfortably high temperature indicates a high concentration of gas or vapor and requires immediate return to fresh air.

Use should be avoided in atmospheres where the contaminant(s) lacks sufficient warning properties (that is: odor, taste, or irritation at a concentration in air at or above the permissible exposure limit). (Vapor and gas removing respirators are not approved for contaminants that lack adequate warning properties.)

Not for use in atmospheres immediately dangerous to life or health unless the device is a powered-type respirator with escape provisions. Air-purifying respirators cannot be used in oxygen deficient atmospheres.

Particulate Removing Respirators

Limitations: Protection against non-volatile particles only. No protection against gases and vapors.

Not for use in atmospheres immediately dangerous to life or health unless the device is a powered-type respirator with escape provisions.

Combination Particulate and Vapor and Gas Removing Respirators

The advantages and disadvantages of the component sections of the combination respirator as described above apply.

Atmosphere-Supplying Respirators

Atmosphere-supplying respirators provide protection against oxygen deficiency and toxic atmospheres. The breathing atmosphere is independent of ambient atmospheric conditions.

General limitations: Except for some air-line suits, no protection is provided against skin irritation by materials such as ammonia and hydrogen cyanide, tritium, or organic phosphate pesticides through the skin. Facepieces present special problems to individuals required to wear prescription lenses. Use of atmosphere-supplying respirators in atmospheres immediately dangerous to life or health is limited to specific devices under specified conditions.

Self-Contained Breathing Apparatus (SCBA)

The wearer carries his own breathing atmosphere.

Limitations: The period over which the device will provide protection is limited by the amount of air or oxygen in the apparatus, the ambient atmospheric pressure (service life of open-circuit devices is cut in half by a doubling of the atmospheric pressure), and the type of work being performed. Some SCBA devices have a short service life (less than 15 minutes) and are suitable only for escape (self-rescue) from an irrespirable atmosphere.

Chief limitations of SCBA devices are their weight or bulk, or both, limited service life, and the training required for their maintenance and safe use.

1. Closed-Circuit SCBA.

The closed-circuit operation conserves oxygen and permits longer service life at reduced weight. The negative-pressure type produces a negative pressure in the respiratory-inlet covering during inhalation, and this may permit inward leakage on contaminants; whereas the positive-pressure type always maintains a positive pressure in the respiratory-inlet covering and is less apt to permit inward leakage of contaminants.

2. Open-Circuit SCBA.

The demand type produces a negative pressure in the respiratory-inlet covering during inhalation, whereas the pressure-demand type maintains a

positive pressure in the respiratory-inlet covering during inhalation and is less apt to permit inward leakage of contaminants.

Supplied-Air Respirators

The respirable air supply is not limited to the quantity the individual can carry, and the devices are lightweight and simple.

Limitations: Limited to use in atmospheres from which the wearer can escape unharmed without the aid of the respirator.

The wearer is restricted in movement by the hose and must return to a respirable atmosphere by retracing his route of entry. The hose is subject to being severed or pinched off.

Air-Line Respirator (Continuous Flow, Demand, and Pressure-Demand Types)

The demand type produces a negative pressure in the facepiece on inhalation, whereas continuous-flow and pressure-demand types maintain a positive pressure in the respiratory-inlet covering and are less apt to permit inward leakage of contaminants.

Air-line suits may protect against atmospheres that irritate the skin or that may be absorbed through the unbroken skin.

Limitations: Air-line respirators provide no protection if the air supply fails. Some contaminants, such as tritium, may penetrate the material of an air-line suit and limit its effectiveness. Other contaminants, such as fluorine, may react chemically with the material of an air-line suit and damage it.

Combination Airline Respirators with Auxiliary self-contained Air Supply

The auxiliary self-contained air supply on this type of device allows the wearer to escape from a dangerous atmosphere. This device with auxiliary self-contained air supply is approved for escape and may be used for entry when it contains at least a 15-minute auxiliary self-contained air supply.

Combination Atmosphere-Supplying and Air Purifying Respirators

The advantages and disadvantages, expressed above, of the mode of operation being used will govern. The mode with the greater limitations (air purifying mode) will mainly determine the overall capabilities and limitations of the respirator, since the wearer may for some reason fail to change the mode of operation even though conditions would require such a change.

Identification of Gas Mask Canisters

The primary means of identifying a gas mask canister shall be by means of properly worded labels. The secondary means of identifying a gas mask canister shall be by a color code.

All who issue or use gas masks falling within the scope of this section shall see that all gas mask canisters purchased or used by them are properly labeled and colored in accordance with these requirements before they are placed in service and that the labels and colors are properly maintained at all times thereafter until the canisters have completely served their purpose.

Table 3

Atmospheric contaminants to be protected against	Colors assigned*
Acid gases	White
Hydrocyanic acid gas	White w/1/2-inch green stripe completely around the canister
Chlorine gas	White w/1/2 - inch yellow stripe completely around the canister
Organic vapors	Black
Ammonia gas	Green
Acid gases and ammonia gas	Green w/1/2-inch blue stripe completely around the canister
Carbon monoxide	Blue
Acid gases and organic vapors	Yellow
Hydrocyanic acid gas and chloropicrin vapor	Yellow w/1/2-inch blue stripe completely around the canister
Acid gases, organic vapors and ammonia gases	Brown
Radioactive materials, excepting tritium and noble gases.	Purple (Magenta)
Particulate (dust, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors.	Canister color for contaminant, as designated above, w/1/2-inch gray stripe completely around the canister
All of the above atmospheric contaminants	Red w/1/2-inch gray stripe completely around the canister

*Gray shall not be assigned as the main color for a canister designed to remove acids or vapors.

NOTE: Orange shall be used as a complete body, or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.

On each canister shall appear in bold letters the following:

Canister for (Name for atmospheric contaminant)
or Type N Gas Mask Canister

In addition, essentially the following working shall appear beneath the appropriate phase on the canister label: "For respiratory protection in atmospheres containing not more than _____ percent by volume of _____"

Canisters having a special high-efficiency filter for protection against radionuclides and other highly toxic particulate shall be labeled with a statement of the type and degree of protection afforded by the filter. The label shall be affixed to the neck end of, or to the gray stripe which is around and near the top of the canister. The degree of protection shall be marked as the percent of penetration of the canister by a 0.3-micron-diameter dioctyl phthalate (DOP) smoke at a flow rate of 85 liters per minute.

Each canister shall have a label warning that gas masks should be used only in atmospheres containing sufficient oxygen to support life (at least 16 percent by volume), since gas mask canisters are only designed to neutralize or remove contaminants from the air.

Each gas mask canister shall be painted a distinctive color or combination of colors indicated in Table 3. All colors used shall be such that they are clearly identifiable by the user and clearly distinguishable from one another. The color coating used shall offer a high degree of resistance to chipping, scaling, peeling, blistering, fading, and the effects of the ordinary atmospheres to which they may be exposed under normal conditions of storage and use. Appropriately colored pressure sensitive tape may be used for the stripes.

Special Hazards

If conditions of oxygen deficiency occurs (less than 19.5% O₂), the SGSS employees will exit immediately to a safe refuge. Also, if a lack of oxygen may occur in the following conditions, the SGSS employee will exit to a safe refuge.

- failure of respirator part
- malfunctions
- face fit difficulty or leakage
- sudden increase in breathing resistance
- sudden decrease or increase in supplied air flow
- sensation of dizziness, weakness, sudden sweating, breathing difficulty

When entering a vault, pit, enclosed space, void or trench, extreme care should be taken to determine the content of; oxygen, H₂S, HCN, CL₂ and other Acid Gases.

As was aforementioned, acid gas cannisters are tested for a limited challenge of specifications. Most acid gases react with oxygen transfer interface in the lung causing

profuse damage. They react to form an acid, or may cause a delayed response with corresponding pulmonary edema.

Acid gas exposure is a common hazard at pulp and paper mills. before performing services with these clients, consult with the Respirator Program Coordinator about appropriate precautions.

Consideration should be given to eye and skin injury.

Sudden release of gases at high concentration like SO₂ and H₂S cause pulmonary paralysis, therefore, the correct respirator should be carried where sudden releases could occur.

Nitrogen Dioxide: Exposures to nitrogen dioxide that may accumulate in low overhead of mechanical repair buildings, ships, from welding or from metal sweating or pickling operations are potentially dangerous. This acid gas will cause a slow progressive pulmonary edema and hemorrhage at concentrations above 5 ppm. Since the affects are not immediately apparent at elevated concentrations, an acute overexposure may safe occurred but symptoms may not appear until 4 to 8 hours later.

Exposure to cadmium oxide fumes from cutting or welding on stainless steel or cadmium coated surfaces are dangerous.

A single acute exposure to cadmium oxide fumes causes severe lung irritation which follows the exposure 4 to 8 hours later by pulmonary edema which may be fatal. The prognosis depends on the extent of the exposure. Warning properties are poor, thus allowing a fatal acute exposure. If recovery does occur, there is likely to be residual lung damage.

The SGSS employee may encounter many chemicals that are not listed in 29 CFR 1910.1000. Only about 500 chemicals are regulated by OSHA. Over 200,000 chemicals are used in industry. Always consult with the Respirator Program Coordinator when MSDSs are not available in order to determine proper respiratory protection. Attempt to ascertain as much information about the chemical and its use and release as possible.

If during the course of inspections, services, monitoring, or emergency situations incidents or conditions are encountered that in the judgment of the Northwest Envirocon, Inc. employee, potentially dangerous concentrations of chemicals exist, they should immediately exit the location.

Typical conditions that warrant immediate exits are:

- Lack of oxygen (below 19.5%)
- Potentially explosive concentrations of vapors

- Concentrations of toxic or hazardous materials that exceed the type and protection factor of the respirator worn
- The presence of the Global employee may endanger others
- The presence of others may endanger the Global employee
- Imminent rupture or release of toxins from containers, regardless if the proper respirator is worn
- Elevated concentrations of poisons (chlorine, hydrogen cyanide, phosgene, phosphine, bromine)
- Sudden or apparent illness of Global employee or others in worksite

In such situations the SGSS employee shall record the incident and notify their project manager or supervisor.

Mandatory Respirator Uses

Certain standards require the use of specific respirators and are based upon anticipated exposures. In such situations, the SGSS employee will have on hand the correct respiratory protection.

Arsenic (10 ug/m³ PEL - 8-hour TWA)

Inorganic arsenic particulate without significant vapor pressure.

Airborne Concentration	Minimum Respiratory Protection
Less than 10 ug/m ³	none required
10 - 100 ug/m ³	1/2 APR w/HEPA Filter
100 - 500 ug/m ³	Full FP-APR w/HEPA Filter
500 - 10,000 ug/m ³	PAPR w/HEPA filter
10,000 - 20,000 ug/m ³	ASR w/full face piece in positive pressure mode.
Unknown or over 20,000 ug/m ³	Full Face piece SCBA in positive pressure demand mode.

Inorganic arsenicals with significant vapor pressure e.g., arsenic trichloride and arsenic phosphides.

Airborne Concentration	Minimum Respiratory Protection
Less than 10 ug/m ³	none required
10 - 100 ug/m ³	1/2 APR w/HEPA Filter and acid gas cartridge
100 - 500 ug/m ³	Front or back mounted gas mask w/HEPA and acid gas canister
500 - 10,000 ug/m ³	1/2 FP - ASR in positive pressure mode
10,000 - 20,000 ug/m ³	FFP - ASR in positive pressure mode w/hood, of suit, or helmet.
Unknown or over 20,000 ug/m ³	Full Face piece SCBA in positive pressure demand mode.

Asbestos (0.1 f/cc PEL - TWA, 1 f/cc excursion limit or STEL)

Airborne Concentration	Minimum Respiratory Protection
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Less than 0.1 f/cc	None Needed
0.1 f/cc - 1 f/cc	1/2 FP - APR with HEPA filters.
1 f/cc - 5 f/cc	FFP - APR with HEPA filters
5 f/cc - 10 f/cc	PAPR equipped w/HEPA SAR w/continuous flow.
10 f/cc - 100 f/cc	FFR - SAR operated in pressure demand mode.
Unknown or over 100 f/cc	Demand mode w auxiliary positive pressure SCBA or HEPA filter FFP - SCBA in positive pressure mode.

Lead (50 ug/m³ PEL - 8-hour TWA)

Airborne Concentration	Minimum Respiratory Protection
Less than 50 ug/m ³	none required
50 - 500 ug/m ³	1/2 APR w/HEPA Filter
500 - 1,250 ug/m ³	Hood or Helmet - APR w/HEPA filter
2,500 - 50,000 ug/m ³	FFP - PAPR w/HEPA filters
50,000 - 100,000 ug/m ³	1/2 SAR in positive pressure demand mode
Unknown or over 100,000 ug/m ³	Full Face piece SCBA in positive pressure demand mode

NOTE: Respirator selection is determined by 1926.62 when disturbing any lead-containing material UNLESS exposure monitoring confirms that respiratory protection may be downgraded or eliminated.

Acrylonitrile (2 ppm PEL -8-hour TWA 10 ppm STEL)

Airborne Concentration	Minimum Respiratory Protection
Less than 2 ppm	none required
2 - 20 ppm	1/2 APR w/organic vapor cartridge or 1/2 SAR
20 - 100 ppm	FFP - APR w/organic vapor cartridge
100 -4,000 ppm	SAR in positive pressure mode w/full facepiece, helmet, hood, or suit
Unknown or over 4,000 ppm	Full Face SAR in positive pressure demand mode
Firefighting	Full Face piece SCBA in positive pressure demand mode

Vinyl Chloride (1 ppm PEL - 8 hour TWA, 5 ppm STEL, not over 15 minutes, no contact w/liquid vinyl chloride)

Airborne Concentration	Minimum Respiratory Protection
Less than 1 ppm	none required
1 - 10 ppm	1/2 APR w/organic vapor cartridge w/ a 1 hour service life up to 10 ppm
10 - 25 ppm	Gas mask front and back mounted w/ a 4 hour service life up to 25 ppm
25 - 100 ppm	FFP - combination type C SAR w/auxiliary self contained air supply.

100 - 1,000 ppm	1/2 type C SAR in continuous flow with helmet or hood
1,000 - 3,600 ppm	1/2 combination C - SAR in pressure demand type and auxiliary self centered air supply
Unknown or over 3,600 ppm	Open circuit FFP - SCBA in pressure demand mode
Benzene (PEL 1 ppm - 8-hour TWA, 5 ppm 15 minute STEL) Airborne Concentration	Minimum Respiratory Protection
Less than 1 ppm	none required
1 - 10 ppm	1/2 APR w/organic vapor cartridge
10 - 50 ppm	FFP APR w/organic vapor cartridge
50 - 100 ppm	FFP PAPR w/organic vapor cartridge
100 - 1,000 ppm	FFP SAR in positive pressure mode
Unknown or over 1,000 ppm	FFP SAR in positive pressure mode w/auxiliary SCBA
Firefighting	FFP SCBA in positive pressure mode
Coke Oven Emissions (150 ug/m³ PEL - 8 hour TWA) Airborne Concentration	Minimum Respiratory Protection
Less than 150 ug/m ³	None Required
150 - 1,500 ug/m ³	1/2-APR w/particulate filter.
Over 1,500 ug/m ³	PAPR w/particulate filter for dust and mists.

Cotton Dust (200 ug/m³ PEL - 8-hour TWA in yarn manufacturing and cotton washing, 500 ug/m³ PEL - 8-hour TWA in textile mill waste house as a vertical elutriator fraction, 750 ug/m³ 8-hour TWA in slashing and weaving as a vertical elutriator fraction.

Airborne Concentration	Minimum Respiratory Protection
Less than 5 x PEL	Disposable dust respirator w/particulate filter.
10 x PEL	1/4 or HFP - APR w/particulate filter.
100 x PEL	FFP - APR w/HEPA filter.
Greater than PEL	PAPR w/HEPA filter.

1,2 - dibromo - 3 - chloropropane (PEL 1 ppb - 8-hour TWA, no eye and skin contact)

Airborne Concentration	Minimum Respirator Protection
Less than 1 ppb	None Required
1 - 10 ppb	SAR
10 - 50 ppb	FFP-SAR w/helmet or hood.
50 - 1,000 ppb	Type C SAR in pressure demand or continuous flow mode.
1,000 - 2,000 ppb	FFP - SAR Type C in pressure demand or positive pressure mode, or helmet and hood in continuous supply mode.

2,000 ppb or entry and escape into unknown	FFP - SCBA in pressure demand or positive pressure mode.
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Ethylene Oxide (PEL 1 ppm - 8-hour TWA, 5 ppm STEL for 15 minutes)

Airborne Concentration	Minimum Respiratory Protection
Less than 1 ppm	None Required
1 - 50 ppm	FFP - APR w/ETO approved canister, back or front mounted.
50 - 2,000 ppm	FFP-SAR in positive pressure demand SAR w/continuous flow and hood or helmet.
Above 2,000 ppm	FFP-SCBA in positive pressure
Firefighting and escape mode.	FFP-APR w/ETO and canister
Formaldehyde (1 ppm PEL - 8-hour TWA, 2 ppm STEL for 15 minutes. Airborne Concentration	Minimum Respiratory Equipment
Less than 1 ppm	None Required
1 - 10 ppm	FFP - APR w/cartridges approved for formaldehyde.
10 - 100 ppm	Full face gas mask w/formaldehyde approved cannisters.
100 ppm or above or firefighting	FFP - SCBA w/positive pressure mode.

Approved Respirators and Parts

Approval labels shall bear the emblem of the Mine Safety and Health Administration (MSHA and/or the Mining Enforcement and Safety Administration and/or U.S. Bureau of Mines) and the seal of the Department of Health, Education and Welfare, the applicant's name and address, an approval number assigned by the Institute, and, where appropriate, restrictions or limitations placed upon the use of the respirator by the MSHA and the Institute (NIOSH). The approval number assigned by the Institute shall be designated by the prefix TC and a serial number. MSHA and the NIOSH shall, where necessary, notify the applicant when additional labels, markings, or instructions will be required.

The use of any MSHA and NIOSH approval label obligates the applicant to whom it is issued to maintain or cause to be maintained the approved quality control sampling schedule and the acceptable level for each characteristic tested, and to assure that it is manufactured according to the drawings and specifications upon which the certificate of approval is based. The use of unapproved or modified respirators is prohibited.

The selection of the proper respirator shall be guided by this summary and the decision logic developed by NIOSH.

1. The nature of the hazard to include:

- type of hazard
 - physical properties of the contaminant (i.e., dust, fume, gas)
 - chemical properties of the contaminant (organic vapor, halogen, etc.)
 - toxic effects
 - estimate of exposure
 - potential for IDLH
2. The nature of the hazardous operation or process.
 3. Location of the hazardous area and access (i.e., shall an escape respirator be necessary).
 4. Time of exposure and exposure pattern.
 5. Physical requirements.
 6. Respirator fit and protection factor.

Training of Personnel and Type of Respirator

At least two models (e.g., North and Racal) of each type of respirator will be available for employee selection. Although SGSS shall maintain an open mind in regard for particular model preferences, economies of scales will cause us to narrow selections to the most cost effective lots. Please keep this in mind. The respirators available include half facepiece and full facepiece air purifying, full facepiece powered air purifying, and open circuit pressure demand self contained breathing apparatus. The only respirators that are issued as personal property will be the half facepiece air purifying respirator. These will not be collected if employees leave the firm.

Each person issued a respirator (to include all of the above) will be trained on each respirator type (e.g., full facepiece vs. half facepiece, SCBA vs. escape, etc.). This training shall consist:

- Type of respiratory hazard for which respirator shall be used.
- Method of selection of respirator to include protection factors.
- The function, capabilities, and limitations of respirator types.
- Method of donning the respirator and face seal.
- Care and maintenance of the respirator and accessories.
- Qualitative and quantitative fit test requirements.
- Recognition and handling emergency situations.
- Prohibited practices.
- Standards and regulations.

The Respirator Program Coordinator is responsible for conducting this training according to this document and specific standard guidelines (lead, asbestos) The training will be given prior to the expected use of the respirator.

Fit Testing

Standards require that a user of demand supply air respirators, self-control breathing apparatus operated in the demand mode, and negative pressure air purifying respirators be fit tested with the respirator model. Note that fit testing of even positive pressure supplied air respirators may be required in the near future because it is now recognized that a wearer can "over-breathe" a positive pressure in the facepiece which would draw air through face seal leads. Also, it does not make safety common sense to send anyone into a life threatening atmosphere without determining if the device is working properly and a protection factor has been established.

Two types of fit tests are qualitative fit tests (QLFT) and quantitative fit test (QNFT). These procedures usually involve generating a test atmosphere around the respirator wearer interface. The QLFT is a subjective test relying almost principally on the judgment of the wearer. Although there may be non-subjective responses in the irritant smoke protocol, for the most part, the examiner passes or fails the wearer at the discretion of the wearer. Inward air leakage at the interface is detected by the wearer and by measurement equipment in the QNFT. This distinction is extremely important although the accuracy of both methods may be ultimately similar.

Although this may suggest favoring the quantitative fit test because an instrument determines "quantitatively" the fit factor with an objective empirical protocol and method. There is no consensus criterion for passing or failing a QNFT, one pass criterion is that the subjects fit factor (FF) is greater than or equal to assigned protection factor (APF). For the OSHA's asbestos and lead standard, the FF must be 10 times the APF.

Positive Pressure Fit Check

This test is performed by the wearer holding the exhalation valve closed and exhaling lightly into the facepiece. A proper fit is exhibited when the face bulges, due to positive pressure. Design of some respirators require removal of the exhalation valve cover.

Negative Pressure Fit Check

In this test the inlets of the cartridges are closed by cup of hand or palm. Inhale lightly so facepiece collapses. Hold down for ten seconds and note any inward leakage.

These tests yield a general determination of respirator fit and valve operation. One or both should be used every time the respirator is donned.

The Fit Test Protocols

There are several methods of qualitative and quantitative fit testing endorsed by OSHA and NIOSH. SGSS will not employ the saccharin solution aerosol, isoamyl aerosol, the corn oil, sodium chloride, aerosol test chamber generation protocol in the qualitative and quantitative fit testing respectively. We shall employ the irritant smoke, and/or the submicron particle in ambient air (Portacount) methods.

Some employees and clients will not be able to wear a half facepiece respirator regardless of its model and size. Such persons shall be fitted with a full facepiece model only. The exercises are designed to assess the comfort, fit, and face seal of the respirators. Each exercise failure reveals evidence about an appropriate size or model.

In the normal breathing exercise, the fit is tested where the face is without movement, at rest. Normally this offers the greatest fit factor in quantitative tests and it is not unusual for some people to pass this test wearing many different models of all sizes. If a test subject cannot pass this test, almost assuredly he/she cannot pass the others. A full facepiece mask should be considered in such a situation. In the deep breathing exercise, the mask face seal is tested for overbreathing. This is common in masks that are too tight (small).

In the side to side exercises, large masks that are not strapped and sealed will leak. This suggests the mask is too large. In the moving head up and down exercise, too small masks will be stretched to open seals as head is up, and too large of masks, or improperly strapped masks will bag from gravity opening seals.

The reading exercise challenges all seals along the face cushions or blanket, and the effectiveness of the facepiece yoke. Too small a mask will typically fail here, as the reading gyrates the upper and lower jaw muscles. The grimace exercise compliments the reading exercise. If mask is too tight (small), face seal grips will occur. Too large a mask may not be challenged here effectively.

The bend over and touch the toes exercises reveals if mask is too large. Face seal is not maintained by headbands if mask sags under gravity. The jogging in place exercise is perhaps the most sensitive and typically reveals the least fit factor. It reveals improper headband positions and loose face seals (mask too large). It also tests for overbreathing.

The second normal breathing exercise reveals a mask that is seated after all seals have been challenged. Typically it's FF will be less than the first exercise, but reveals the most accurate fit factor since the mask is theoretically completely seated by now.

Irritant Smoke Test

This qualitative fit test involves the use of an irritant aerosol usually hydrochloric acid. The most common source of the irritant is from smoke tubes used to determine air flow in ventilation systems. Such tubes contain stannic acid/titanium tetrachloride which

reacts with moisture in air to produce hydrochloric acid and chlorine gas. The test may be too irritating for some during hot, humid conditions. Perform test in dry, cool, well ventilated rooms.

The advantage of this test over the isoamyl acetate (banana oil) is that a broader range of test persons can sense it and indeed react to it involuntarily (cough, wince, etc.). This enables the proctor to better ascertain a correct fit test and not rely solely on the discretion of the wearer. The disadvantage is that the aerosol is irritating, producing coughing and dyspnea. People may bolt from fumes and injure themselves.

The type of respirator to be tested must have a combination high efficiency and acid-gas cartridge. Do not use just HEPA filters as this will not filter hydrochloric acid and chlorine gas fumes.

The following test procedure shall be implemented:

- If the test subject has not previously been issued and fit tested with a respirator provided by SGSS, he or she shall be allowed to select from at least two manufacturers' elastomeric half facepiece respirators.
- The selection shall be conducted in a room separate from the test area or chamber. Prior to selection, the proctor shall show how to don a respirator, how to set strap tension, and how to determine a comfortable respirator. The test subject shall be told to select the most comfortable respirator.
- After the mask(s) have been selected, it shall be worn at least five minutes to assess comfort. All adjustments and positioning shall be conducted by the test subject only. The test subject should don and strap the respirator several times to properly seat the respirator.
- The proctor shall discuss various points that determine fit and comfort: positioning of mask on nose, room for eye protection, room to talk, positioning mask on face and cheeks, strap tension, chin placement, nose bridge fit, tendency to slip and self-observation, and distance from nose to chin.
- The test subject shall conduct negative and positive pressure checks and shall seat the respirator by rapidly moving the head from side to side and up and down.
- The test subject is now ready for fit testing.
- The test subject shall remove their respirator and be permitted to smell a weak concentration of the irritant smoke away from the test area.
- The test subject shall don the respirator, perform a negative and a positive fit check, and wear it for ten minutes.

- The proctor shall deliver the irritant smoke using a pump. Do not use a suction bulb. It shall be delivered at 200 ml/minute through a smoke tube attached.
- The test subject shall be advised that the fume is irritating and to close eyes during test.
- The proctor shall direct the smoke around the perimeter of the mask beginning about twelve inches away and moving gradually to one inch.
- The proctor shall challenge the test subject to conduct the exercises for one minute each exercise while smoke is directed. The proctor shall monitor a clock or watch during the exercise.

Exercises

- a. breathe normally
 - b. breathe deeply and regularly
 - c. turn head from side to side completely, inhale on each side
 - d. nod head up and down each second, inhale when head is up facing ceiling; do not bump head on neck or chest.
 - e. talk aloud for one minute; read Rainbow Passage.
 - f. jog in place
 - g. breathe normally
- The test area shall have exhaust ventilation sufficient to contain contaminant from exiting the test area.
 - During the above exercise, the test subject shall indicate to the proctor if smoke was detected. If smoke is detected, the exercise is stopped and another respirator is selected.
 - Those test subjects who pass the exercise shall be given a sensitivity check of smoke from same tube to determine reaction. Failure to evoke a response shall void the test.
 - The test shall not be conducted if there is hair growth between seal and skin.
 - These tests are repeated every six months or immediately after weight change of 20 pounds, facial scarring, significant dental surgery, cosmetic or reconstructive face surgery, or any condition that interferes with face seal.

Quantitative Fit Test

Since OSHA and NIOSH have not promulgated a standard operating procedure for submicron ambient air aerosol fit testing, SGSS practices shall follow TSI

manufacturers recommended procedures and use ANSI Z88.2-1980 as a general guide and these points as well:

- The test subject must wear the selected facepiece for five minutes before testing begins.
- The test subject shall be given complete instructions as to his/her part in the procedures.
- After passing test, the test subject shall wear the respirator for one week, to see if it is comfortable.
- SGSS will not permit the continued testing or exercise of test protocols of any employee, client, who exhibits dizziness, excessive coughing, gasping, nausea, etc.

Portacount Operation

Note: Commands separated by a hyphen should be depressed simultaneously - for example, "enable-on" means "Press the enable and on buttons simultaneously".

1. Press enable-on; LCD counts down 60 seconds.
2. After machine warms it is in fit test mode.

Three modes:

1. Fit Test Mode - Quantitative fit tests
2. Sequential Mode - Test filter penetration
3. Count Mode - Count ambient particle

To select mode press enable-mode until indicator light shows selective mode.

To shut unit off - enable-off.

Fit Test Mode

- Step 1: Attach tube marked "s" to sample part on respirator;
- Step 2: Press enable-test, the "E" then flashes after completing first cycle fit factor appears in scientific notation, fail-pass indication is given, Portacount continues test cycle every 80 seconds. To end test, press
- Step 3: Enable-test. Overall pass or fail is indicated.

Error Messages

E-E = Particulate level is < 1500 particulate/cc

1. Portacount - flooded with alcohol.
2. Tube assembly plugged/improperly connected.
3. Alcohol level is low.
4. Ambient particle concentration is low.

Low-Message: Batteries below operational levels.

Calculating Fit Factor

CB = Particle concentration (ambient) before resp. sample

CA = Particle concentration (ambient) after resp sample

CR = Particle sample inside respirator

C = Ambient air sample

$$FF = \frac{CB + CA}{2CR}$$

Fit Factor: Ambient before resp. + Ambient air after resp sample

2. Particle sample with respirator

Overall fit factor

$$\text{Overall FF} = \frac{100}{s/n}$$

s = sum of penetration for each test cycle in %

n = number of test cycles

Expanded

$$\text{Overall FF} = \frac{100}{(\%P_1 + \%P_2 + \%P_3 + \%P_4 + \%P_n/n)}$$

%P = Penetration of percent for each test cycle

Use for calculation of overall fit factor.

N = Number of cycles

FF = Fit factor each test cycle

$$\text{Overall FF} = \frac{N}{1/FF_1 + 1/FF_2 + 1/FF_3 \dots 1/FF_n}$$

Quantitative FT Protocol/Operation

1. Assemble: make operational Portacount testing unit.

2. Acquire employee information.
3. Explain principal/test protocol.
4. Don; achieve adequate positive/negative pressure fit checks, comfortable fit, wear respirator 10 minutes.
5. Run phased tests: 9 steps.
6. Calculate fit factor (overall).
7. Record QFT fit test form.
8. Employee sign.
9. Clean respirator for next test subject.

Recordkeeping

All records of fit testing will be kept on file for three years. A record of qualitative fit testing shall be recorded on the current SGSS fit test form. It shall include name, date, respirator model size and approval number, and testing agent. Quantitative fit tests shall also be recorded on a card carried by those who are tested. This card will contain the same information, but also the average protection factors for the respirators tested.

Facial Hair

29 CFR 1910.134 (e)(5)(1) requires that "Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be a growth of beard, side burns, a skull cap that projects under the facepiece, or temple pieces on glasses." Beards, side burns, mustaches, temple of glasses may not come between the face and the respirator seal. Hair must be trimmed or removed so not to allow leakage. Employees who must wear a respirator in the course of their duties are expected to maintain hair and mustache styles that do not interfere with fitting.

Glasses, Contacts and Eye Protection

Providing respiratory protection for employees wearing corrective glasses and lenses presents face fit problems for full facepiece respirators. A proper seal cannot be established if temple bars extend through the sealing edge. Specially manufactured nosepieces are available for support of glasses with temple bars removed. Generally, contact lenses are not allowed because a respirator may concentrate chemical exposure and aggravate the eyes. Vision may also be impaired if contact lenses are dislodged inside the mask. Eye glasses are not allowed if positive pressure supplied air respirators are used unless they encase the head.

Availability, Issue and Purchase of Respirator

The minimum respiratory equipment that must be on hand per project, when applicable, include one half mask APR with complete set of canisters per each laborer, foreman, superintendent, truck driver, insulator. These are considered personal and will not be returned upon termination with the firm and requires that at least two manufacturer's

models of silicon and rubber elastomers be made available in small, medium, and large sizes during selection. Such approved models made available will generally be at the discretion of the Respirator Program Coordinator and the purchasing agent.

All respiratory equipment shall be inventoried yearly. All excess equipment and equipment for training and equipment for fit test selection will be stored at the office. All personnel shall return clean and serviceable full facepiece, APR, ASR, PAPR, and SCBA's to the office when the project is completed.

The Respirator Program Coordinator will issue respirators for all other personnel. No employee will engage themselves on any hazardous work site or operation before they are fit tested and have serviceable and appropriate respiratory equipment.

No SGSS employee shall use client provided respiratory equipment unless the project manager and Respiratory Program Coordinator have been given assurances that employees will be appropriately fit tested by client and be issued approved respirators appropriate for hazards anticipated. The issuance period will not extend more than six months. At that time, a new fit test will be conducted.

Inspection, Cleaning, Disinfecting, Storage, and Maintenance

The provisions of 29 CFR 1910.134 (2) Maintenance and care of respirators, provide adequate general guidance for care of respirators. Additional guidance is given as follows:

1. Air purifying respirators (quarter-mask, half-mask, full facepiece and gas mask)
 - A. Rubber facepiece - check for:
 1. Excessive dirt (clean all dirt from facepiece)
 2. Cracks, tears, or holes (obtain new facepiece)
 3. Distortion (obtain new facepiece)
 4. Rubber stiffness (caused by loss of flexibility when not worn for a length of time)
 5. Cracked, scratched, or loose-fitting lenses in full facepiece (replace as needed)
 6. Cracked or broken air-purifying element holder(s), badly worn threads, or missing gaskets (replace as needed).
 - B. Headstraps - check for:
 1. Breaks or tears (replace headstraps)
 2. Loss of elasticity (replace headstraps)
 3. Broken or malfunctioning buckles or attachments (replace headstraps)
 4. Excessively worn serrations on the head harness which might allow facepiece to slip (replace headstrap)
 5. Headgear suspension (adjust properly to fit).

C. Inhalation valve, exhalation valve - remove cover and check for:

1. Foreign material, such as detergent residue, dust particles, or human hair under the valve (clean residue with soap and warm water)
2. Cracks, tears or distortion in the valve material or valve seat (replace valve or facepiece if seat is damaged)
3. Improper insertion of the valve body in the facepiece (reposition)
4. Cracks, breaks or chips in the valve body, particularly in the sealing surface (replace valve)
5. Missing or defective valve cover (replace valve cover)
6. Improper installation of the valve in the valve body.

D. Filter elements - check for:

1. Incorrect cartridge, canister, or filter for the contaminant
2. Approval designation (must be current - have NIOSH/MSHA seals on the plate)
3. Missing or worn gaskets (replace)
4. Worn or damaged threads - both filter threads and facepiece threads (replace filter or filter holder, whichever is applicable)
5. Incorrect installation, loose connections
6. Cracks in outside case filter, cartridge or canister
7. Deterioration of gas mask canister harness (replace harness)
8. For end-of-life indicating canisters, check indicator window (replace if discolored)

E. Flexible corrugated breathing tube (gas mask) - check for:

1. Cracks or holes, sign of deterioration (replace tube). Cracks can often be seen by stretching the tube.
2. Missing or loose hose clamps (obtain new clamps)
3. Broken or missing end connectors (replace tube)

2. Atmosphere-supplying respirators

A. Check facepiece, headstraps, valves and breathing tube, as for air-purifying respirators.

B. Hood, helmet, blouse, or full suit, if applicable - check for:

1. Rips and torn seams (if unable to repair the tear adequately, replace)
2. Headgear suspension (adjust properly to you)
3. Cracks or breaks in faceshield (replace faceshield)
4. Protective screen must be intact and fit correctly over the faceshield (obtain new screen)

C. Air-supply system - check for:

1. Approval for use (NIOSH/MSHA seals and a "TC" number)
2. Breathing air quality (CGA spec G-7.1 - 1973 Grade D or better; maximum of 5 mg/m³ hydrocarbons, 20 ppm CO, 1000 ppm CO₂)
3. Breaks or kinks in air-supply hoses approved as part of respirator and end-fitting attachments (replace hose and/or fitting)
4. Tightness of connections
5. Proper setting of regulators and valves (consult manufacturer's recommendations)
6. Correct operation of air-purifying elements (Deltech Engineering. or Hawkinson purification systems) and carbon monoxide and/or high-temperature alarms.

D. Self-contained breathing apparatus (SCBA):

1. Check the charge on the high-pressure cylinder (recharge if less than 75% service time remains)
2. On closed-circuit SCBAs, make sure that a fresh canister of CO₂ sorbent is installed and ready for use before an emergency situation occurs, or that the total use time on the canister is known.

Cleaning and Disinfecting

Cleaning and disinfecting procedures should follow the same organization as inspection and repair (central facility for large users and for atmosphere-supplying respirators and user-performed for small users and routine respirator use). Respirators must be cleaned and disinfected between uses. Respirators assigned to individuals should be cleaned after each use. Respirators that are kept for emergency use only must be cleaned and disinfected after each use.

Two methods are commonly used for cleaning:

Manual

Remove filters, canisters or cartridges from facepiece (do not wash air-purifying elements).

Wash with a brush in warm water containing disinfecting detergent (one packet MSA Sanitizer-Cleaner per gallon of water). Alternately, a household detergent may be used followed by a disinfecting rinse (hypochlorite solution: two tablespoons chlorine bleach per gallon of water; or iodine solution: one teaspoon tincture of iodine per gallon of water).

Rinse with warm water.

Air dry in a clean place.

Reassemble respirator and place in sealed plastic bag.

Between thorough detergent washings, daily cleaning and disinfecting may be accomplished using a Clinipad or other disinfecting towel to wipe out the respirator.

Machine

Remove filters, canisters or cartridges from facepiece.

Use a standard domestic dishwasher with a rack to hold the facepieces in place (commercial respirator washing machines are also available).

Wash with household detergent, warm water (120-140°F).

Add sanitizer to rinse cycle as per manual instructions.

Do not heat dry. Use "air dry" setting or shut off and open machine until dry.

Reassemble respirator and place in sealed plastic bag.

As described above, a disinfecting towel such as Clinipad may be used between thorough washings to clean and disinfect the respirator.

Do not use solvents, oils, or baby powder in cleaning disinfecting respirators. Respirators may be allowed to dry by themselves on a clean surface, or suspended from a horizontal wire, like drying clothes. Respirator drying cabinets may be built from a standard steel storage cabinet using an electric heater (115 VAC, 1650 W) and a simple thermostat set between 120-140°F that has a built-in circulating fan. Replace the solid shelves with aluminum mesh or stainless steel mesh.

Storage

Respiratory equipment must be stored to protect it from dust, sunlight, heat, extreme cold, excessive moisture, mechanical damage and damaging chemicals. Leaving a respirator unprotected on a workbench, or in a tool cabinet or tool box, may result in damage or deterioration of the respirator, reducing its effectiveness.

After cleaning and disinfecting respirators, they should be placed individually in heat-sealed or re-sealable (Ziploc) plastic bags until reissue. Respirators must be stored in a single layer, with the facepiece flat and exhalation valve up to prevent the rubber or plastic from taking a permanent distortion (set).

Air-purifying respirators kept ready for either routine or emergency use should be stored in sealed plastic bags in a cabinet in individual compartments. Each compartment should be labeled with the user's name or the respirator size. The storage cabinet should be readily accessible and locations should be a part of employee training.

SCBA equipment should be stored in well-sealed wall-mounted cabinets that allow fast donning but protect the units from contamination and corrosion. Locate SCBA where they are accessible for escape, emergency work (e.g., emergency shut-down) and rescue. Rescue units must be placed close enough to the work area for rescue use, but away from contamination during an upset or emergency condition.

Manufacturing or operational defects in respirators should be referred to the Respirator Program Coordinator or Project Manager for resolution. Conversely, the Respirator Program Coordinator is responsible for informing Northwest Envirocon, Inc. staff of information relating to respirator defects and corrective actions.

Record of Exposure

29 CFR 1910.20-Access to Employee Medical Record This federal standard requires both employer and employees to be aware of the potential and actual exposures to hazardous chemicals related to job activity. It gives an employee the right to access and examine and copy his health related exposure. It includes environmental, personal and related technical data such as MSDS. This would include estimates of exposure for respirator issuance which is placed in medical records. Employees are encouraged to record for their medical records, significant exposures to include occasions when respirators must be worn to protect against toxic chemicals.

Bioassay

Bioassay may be used to determine suspected overexposure and absorption requiring treatment or review of procedures (e.g., lead, arsenic).

Program Audit

SGSS will conduct an annual audit of the program to include an evaluation of the administration, degree of implementation, and relative effectiveness. The Vice Director of Environmental Safety and Health will conduct the audit.

Reporting of Deficiencies

The following procedure is used in dealing with occasional manufacturer's deficiencies in respirators, equipment failures, functional problems, or ergonomic difficulties that restrict SGSS field employees from wearing respirators as the need arises. Such situations, conditions, or incidents shall be reported by employees to their supervisor and to the Respiratory Program Coordinator who shall resolve the issue or report the problem to the Director of Environmental Safety and Health for advice or resolution.

Program Manager

Clare R. Hall - General Manager

