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	Safety RESPIRATORY PROTECTION PROGRAM	
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DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Washington, DC 20314

ER 385-1-90

DAEN-ECS

Regulation
No. 385-1-90

28 March 1983

Safety
RESPIRATORY PROTECTION PROGRAM

Issue of supplements to this regulation by Commanders, Field Operating Activities (FOA), is permitted but is not required. If supplements are issued, DIVCDR and CDR, separate FOA, will furnish one copy of each to (DAEN-ECS) and (DAEN-ASP-R) WASH, DC 20314; DISTCDR will furnish required copies to appropriate DIVCDR.

1. Purpose. To establish a respiratory protection program for the Corps of Engineers in order to reduce occupational respiratory disease and related respiratory problems among USACE personnel.

2. Applicability. This regulation applies to all HQUSACE/OCE elements and all field operating activities (FOA), both military and civilian. (For contractor requirements, see EM 385-1-1.)

3. References.

a. Code of Federal Regulations, 29 CFR 1910.134, Occupational Safety and Health Standards, Respiratory Protection, with amendment.

b. American National Standard, ANSI Z88.2-1980, Practices for Respiratory Protection, 22 May 1980.

c. TB MED 502, Occupational and Environmental Health, Respiratory Protection Program.

d. National Institute for Occupational Safety and Health, DHEW (NIOSH) Publication No. 76-189, A Guide to Industrial Respiratory Protection, April 1979.

e. National Institute for Occupational Safety and Health, NIOSH Publication No. 78-193A, Respiratory Protection - An Employer's Manual, October 1978.

f. National Institute for Occupational Safety and Health, NIOSH Publication No. 78-193B, Respiratory Protection - A Guide for the Employee, October 1978.

g. AR 385-10, The Army Safety Program, 1 February 1979, with USACE Supplement 1.

h. EP 385-1-58, Medical Surveillance Handbook.

4. Definition. For the purpose of this regulation the following terms shall mean:

a. Contaminant. Any harmful, irritating, or nuisance material that is foreign to the normal atmosphere. Contaminants can be particulates, gases, or vapors.

(1) Particulates.

(a) Dusts - A submicroscopic to visible solid which is mechanically produced by such processes as grinding, crushing, drilling or blasting.

(b) Fibers - A fiber is a special class of dust which has a length at least three times its diameter.

(c) Fumes - A solid, normally less than one micrometer in diameter, usually formed in air above molten metal by vaporization of the metal, oxidation of the vapor, and condensation of the oxide.

(d) Mists - Submicroscopic to visible droplets rendered airborne by bubbling, boiling, spraying, splashing or by condensation from air supersaturated with the vapor of a substance.

(2) Gases. A substance in the gaseous state at normal workroom temperatures.

(3) Vapors. The gaseous state of a substance in the liquid or solid state at normal workroom temperatures.

b. Immediate Danger to Life or Health (IDLH). Any atmosphere that poses an immediate hazard to life or produces immediate irreversible debilitating effects on health.

c. Oxygen Deficient. Any atmosphere that contains less than 19.5% oxygen by volume. An oxygen deficiency becomes IDLH when the ambient partial pressure of oxygen becomes less than 110 mm Hg.

d. Protection Factor. A measure of the overall effectiveness of a respirator (see Appendix A for assigned protection factors).

e. TLV and PEL. Threshold Limit Values (TLV) and Permissible Exposure Limits (PEL) are contaminant exposure levels not to be exceeded. PEL(s) are listed in 29 CFR 1910 and the TLV(s) are published yearly by the American Conference of Governmental Industrial Hygienist. Consult your Safety and Occupational Health Office for interpretation of these standards.

f. Warning Properties. This refers to the human senses of taste, smell, and eye or throat irritation. A substance has adequate warning properties if the substance's odor, taste, or irritant effects are detectable and persistent at concentrations at or below the Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV).

5. Essential Elements of a Respiratory Protection Program.

a. Written SOP which establishes procedures and assigns responsibilities.

b. Engineering control measures to reduce the contaminant level.

c. Respirator Selection Criteria.

d. Medical Surveillance.

e. Respirator Fit Testing.

f. Work Area Surveillance.

g. Respirator Inspection and Maintenance.

h. Employee Training.

6. Responsibilities.

a. HQUSACE/OCE. The Chief, Safety and Occupational Health Division is responsible for staff planning, development, supervision and review of the respiratory protection program, and shall:

(1) Provide for staff coordination, policy guidance, and administrative and technical review of the program.

(2) Maintain liaison with Army Staff and other government agencies to insure that the USACE Respiratory Protection Program meets legal administrative procedures and adequately protects workers.

(3) Develop supervisor and employee respiratory protection training program and assist FOA in preparing appropriate training.

b. FOA.

(1) Commanders/Directors. Each FOA Commander/Director is responsible for implementing the FOA's respiratory protection program and providing adequate resources for program administration.

(2) Safety and Occupational Health Office. The FOA Safety and Occupational Health Office will develope and manage the FOA respiratory protection program and will assure that:

(a) A written SOP or regulation is developed which establishes procedures and assigns responsibilities for all aspects of the respiratory protection program. Selection of respirator type, assignment of risk assessment codes, and annual program evaluations will be the responsibility of the FOA Occupational Safety and Health Office.

(b) Work areas are surveyed.

(c) Supervisors have been provided training qualifying them to perform fit tests and provide worker training.

(3) Supervisor. All supervisors will:

(a) Through job hazard analysis, review job duties and notify the Personnel and Safety Offices of positions which require employees to use respiratory protection (to include the use of respirators for emergencies and fire fighting). (See EP 385-1-58.)

(b) Request Safety Office assistance in determining when respiratory protection is required and the type required, and in providing work area surveillance and training materials for employees.

(c) Develop a written SOP for care and use of respirators.

(d) Fit test and train employees on the hazards of their work and on proper use of respiratory protection.

(e) Make the use of safety equipment a provision in the employee's job performance standards.

(f) Notify management of operations/areas requiring engineering controls.

(4) Employee. All employees who work at operations which require the use of respiratory protection will:

(a) Wear a respirator when required, and properly maintain it.

(b) Immediately leave the contaminated area if the respirator malfunctions.

(c) Notify their supervisiors when they suspect a respiratory hazard or have a respiratory problem.

(d) Take appropriate medical exams.

7. Permissible Use of Respirators.

a. Respirators shall only be used in lieu of engineering/ administrative control measures:

(1) When engineering controls, process changes or chemical substitution (capable of reducing exposures to less than one half the TLV or PEL) are not feasible;

(2) During the interim until control measures in (1) above can be implemented; or

(3) During emergencies.

b. Only NIOSH/MSHA approved respiratory protective equipment shall be used.

c. If respiratory protective equipment is to be used in IDLH atmospheres or for entry into confined spaces, safe use procedures must be developed prior to its use.

8. Risk Assessment Codes. A risk assessment code and cost effective index will be calculated and assigned to all nonemergency respiratory hazards. In addition, the feasibility of implementing engineering control measures will be determined, taking into account the technology available, future use of the facility, and risk assessment code and cost effectiveness index assigned (see reference h).

9. Inclusion Criterion. All employees who are required to use respiratory protection in performing their duties (to include intermittent or emergency use) will be included in the respiratory protection program. They will be provided proper respirators, appropriate medical exams, fit tests, and training. Personnel who require corrective lenses and use full facepiece respirators will be provided corrective lense inserts for their respirators.

10. Respirator Selection. Respirators will be selected in accordance with Appendix A. Routine and intermittent use respirators shall be assigned to individuals for their exclusive use, when possible.

11. Work Area Surveillance. All areas and operations, where a respiratory hazard is present or suspected, will be surveyed to determine the nature and extent of the hazard. Initial surveys will be conducted to determine if respiratory protection is required and the type required. Periodic surveys will be conducted, during routine industrial hygiene surveys to ensure that proper respiratory equipment and procedures are being used.

12. Medical Surveillance. Employees required to use respiratory protection will be given preplacement and annual medical exams. Medical exam shall include, at minimum, a medical history, pulmonary function test and, if appropriate, medical tests for specific contaminant for which the respirator is being used. EP 385-1-58, gives medical testing requirements for specific exposures and outlines basic procedures which may be used for scheduling medical exams.

13. Program Evaluations. Each FOA will evaluate their respiratory protection annually. General guidance for program evaluations is listed in Appendix B.

14. Respirator Inspection and Maintenance.

a. Routine and Intermittent Use Respirators shall be inspected prior to use. Each respirator shall be cleaned and sanitized after each day's use.

b. Respirators For Emergency Use shall be inspected at least monthly and after each use. Emergency respirators shall be cleaned and sanitized after each use. A record of inspections will be kept with the equipment for one year.

15. Fit Testing. Each employee required to use a negative pressure respirator will be fitted test to insure a proper fit using an appropriate qualitative or quantitative fit test procedures listed in Appendix C. Positive pressure respirators do not require fit testing.

16. Training.

a. Supervisor. Supervisors, who have operations requiring the use of respiratory protection, will be trained in respirator selection, proper use, fit test procedures and inspection procedures.

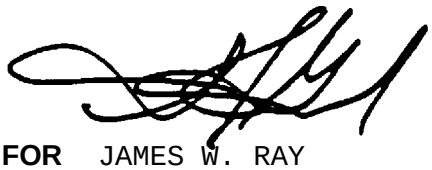
b. Employee. Each employee in the respiratory protection program will be instructed in the proper use of respirators, negative and positive fit tests, the purposes of medical examinations, prohibited practices (facial hair, contact lenses, etc) and inspection procedures. Employees will be given refresher training at least annually.

17. Breathing Air.

a. Breathing air for industrial use must meet the air quality requirements of Compressed Gas Associations Specification G7.1, 1966, Grade D Breathing Air. Quality of air from compressors must be tested at least semiannually and records of results kept for five years (see Appendix D, para D-1, for air quality parameters). Requirements for underwater breathing air can be found in ER 385-1-86, Underwater Diving.

b. Compressors must meet the safety requirements of 29 CFR 1910.134(d) and 29 CFR 1910.92 (a)(6) (see Appendix D, para D-3, for general requirements).

FOR THE COMMANDER:



FOR JAMES W. RAY
Colonel, Corps of Engineers
Chief of Staff
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L.I.C. CE
Asst. Chief of Staff

4 Appendices
APP A - Respirator Selection
APP B - Program Evaluation Guidance
APP C - Fit Testing Procedures
APP D - Compressed Breathing Air

APPENDIX A

RESPIRATOR SELECTION

A-1. The FOA Safety and Occupational Health Office is responsible for advising supervisors on the type of respirator required. In selecting a respirator, Safety/Health and supervisory personnel should assemble the information needed by answering the following questions:

a. What is the measured or estimated contaminant concentration at the breathing zone of the worker?

b. What is the Permissible Exposure Limit (PEL) and/or Threshold Limit Value (TLV) of the contaminant? (Use more strigent of the two.)

c. Is the workspace oxygen deficient (less than 19.5% oxygen)?

d. What is the lower explosive limit (LEL) of the contaminant?

e. Does an IDLH situation exist at contaminant concentration?

f. If gas or vapor --

(1) Is efficient sorbent available?

(2) Does contaminant have adequate warning properties?

g. Will eye irritation occur at contaminant concentration?

h. Will skin absorption pose a problem?

i. Are there other circumstances/conditions which should be considered?

A-2. Using the above information and Tables A-1 - A-3, select the proper type of respirator and facepiece. Sections of these tables have been extracted from OSHA Instructions 2-20.20 CH-4, 2 MAR 82; and CPL 2-20.20 CH-4, 4 JUN 82, the original sources being "ANSI STANDARDS" and "Respirator Protection Factors" E. Hyatt, Los Alamos Scientific Laboratory Publication LA - 6084 - MS, Jan 76.

TABLE A-1
RESPIRATOR SELECTION GUIDE

HAZARD	TYPE RESPIRATOR
GASES OR VAPORS	
Oxygen Deficiency	Self-contained breathing apparatus, positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Immediately dangerous to life or health (IDLH)	Self-contained breathing apparatus in positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Not immediately dangerous to life or health	Air-line respirator. Air-purifying, half-mask or full facepiece respirator with chemical cartridges or canister.
PARTICULATES	
Immediately dangerous life or health (IDLH)	Self-contained breathing apparatus in to positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Not immediately dangerous to life or health	Air-line respirator. Air-purifying, half-mask or full facepiece respirator with filters (pads or cartridges). Air-line abrasive-blasting helmet.
COMBINATION GASES, VAPORS AND PARTICULATES	
Immediately dangerous life or health (IDLH)	Self-contained breathing apparatus in to positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Not immediately dangerous to life or health	Air-line respirator. Air-purifying, half-mask or full facepiece respirator with chemical cartridges or canister and appropriate filters.

TABLE A-2

PROTECTION FACTORS FOR
PARTICULATE FILTER RESPIRATORS

Concentration in multiples of the PEL or TLV	Facepiece Pressure	Permissible Respirators
5 X	-	Single use dust
10 X	-	Half-mask dust
	-	Half-or quarter mask, fume
	-	Half-or quarter mask, high efficiency
	-	Half-mask supplied air
50 X	-	Full facepiece, high-efficiency
	-	Full facepiece, supplied air
	-	Self-contained breathing apparatus (SCBA)
1,000 X	+	Powered, high-efficiency, all enclosures
	+	Half-mask, supplied air, Type C positive pressure, demand mode
2,000 X	+	Supplied air with full facepiece, hood, helmet or suit, Type C positive pressure, demand mode
10,000 X	+	Full facepiece, SCBA
	+	Full facepiece supplied air and auxiliary self-contained air supply
Fire fighting or emergency entry into unknown concentrations	+	Full facepiece SCBA
Escape only	+	Any SCBA
	+	Any self rescuer

1/ In an atmosphere which is immediately dangerous to life or health.

Notes: 1. Half-mask and quarter-mask respirators should not be used if the particulate matter causes eye irritation at the use concentrations.

2. Full facepiece supplied-air respirators should not be used in any atmosphere which is immediately dangerous to life or health unless it is equipped with an auxiliary air supply which can be operated in the positive pressure.

TABLE A-3

PROTECTION FACTORS FOR
GAS OR VAPOR RESPIRATORS

Concentrations in multiples of the PEL or TLV	Facepiece Pressure	Permissible Respirators
10 X	-	Half-mask chemical cartridge respirator with "Name" cartridges, or canister half mask, supplied-air
50 X	-	Full facepiece gas mask or chemical cartridge with "Name" cartridges or canister.
	-	Full facepiece SCBA
		Full facepiece supplied-air
1,000 X	+	Half-mask supplied-air
2,000 X	+	Supplied-air with full facepiece, hood, helmet or suit
10,000 X	+	Full facepiece, SCBA
	+	Full facepiece supplied air with auxiliary self-contained air supply
Fire fighting or emergency entry into unknown concentrations	+	full facepiece SCBA
Escape only 1/	+	Any full facepiece SCBA
	+	Any self-rescuer

1/ In an atmosphere which is immediately dangerous to life or health.

NOTES: 1. The "Name" means approved chemical canisters or cartridges against a specific contaminant or a combination of contaminants such as organic vapor, acid gases, organic vapor plus particulates or acid gases plus organic vapor.

2. Quarter or half-mask respirators should not be used if eye irritation occurs at the use concentration.

3. Full facepiece supplied air respirators should not be used in any atmosphere which is immediately dangerous to life or health unless it is equipped with an auxiliary air tank which can be operated in the positive pressure mode.

4. Air purifying respirators cannot be used for contaminants having inadequate warning properties.

APPENDIX B

GENERAL GUIDANCE FOR PROGRAM EVALUATIONS

In general, the respirator program should be evaluated at least annually, with program adjustments made to reflect the evaluation results. Program function can be separated into administration and operation.

B-1. Program Administration.

a. Is program responsibility vested in one individual who is knowledgeable and can coordinate all aspects of the program?

b. What is the present status of the implementation of engineering controls to alleviate the need of respirators?

c. Are there written procedures/statements covering the various aspects of the respirator program?

(1) designation of administrator;
(2) respirator selection;
(3) purchase of approved equipment
(4) medical surveillance of respirator users;
(5) issuance of equipment;
(6) fitting;
(7) maintenance, storage, repair;
(8) inspection; and
(9) use under special condition.

B-2. Program Operation.

a. Respiratory protective equipment selection.

(1) Are work area conditions and employee exposures properly surveyed?

(2) Are respirators selected on the basis of hazards to which the employee is exposed?

(3) Are selections made by individuals knowledgeable of selection procedures?

(4) Are only approved respirators purchased and used and do they provide adequate protection for the specific hazard and concentration of the contaminant?

(5) Where practical, have respirators been issued to the users for their exclusive use, and are there records covering issuance?

* Source: "Respiratory Protection - An Employer's Manual", NIOSH PUB 78-193A, Oct 78

b. Medical Evaluations. Has a medical evaluation of the prospective users been made to determine their physical and psychological ability to wear respiratory protective equipment?

c. Respiratory protective equipment fitting.

(1) Are the users given the opportunity to try on several respirators to determine whether the respirator they will subsequently be wearing is the best fitting one?

(2) Is the fit tested at appropriate intervals?

(3) Are those users who require corrective lenses properly fitted?

(4) Are users prohibited from wearing contact lenses when using respirators?

(5) Is the facepiece to face seal tested in a test atmosphere?

d. Maintenance of respiratory protective equipment.

(1) Cleaning and Disinfecting.

(a) Are respirators cleaned and disinfected after each use when different people use the same device, or as frequently as necessary for devices issued to individual users?

(b) Are proper methods of cleaning and disinfecting utilized?

(2) Storage.

(a) Are respirators stored in a manner so as to protect them from dust, sunlight, heat, excessive cold or moisture, or damaging chemicals?

(b) Are respirator stored properly in a storage facility so as to prevent them from becoming deformed?

(c) Is storage in lockers and tool boxes permitted only if the respirator is in a carrying case or carton?

(3) Inspection.

(a) Are respirators inspected before and after each use and during cleaning?

(b) Is respiratory protective equipment designated as "emergency use" inspected at least monthly (in addition to after each use)?

(c) Is a record kept of the inspection of "emergency use" respiratory protective equipment?

(4) Repair.

(a) Are replacement parts used in repair those of the manufacturer of the respirator?

(b) Are repairs made by knowledgeable individuals?

(c) Are repairs of SCBA made only by certified personnel or by a manufacturer's representative?

(5) Special Use Conditions.

(a) Is a procedure developed for respiratory protective equipment usage in atmospheres immediately dangerous to life or health?

(b) Is a procedure developed for equipment usage for entry into confined spaces?

(6) Training.

(a) Are users trained in proper respirator usage?

(b) Are users trained in the basis for selection of respirators?

APPENDIX C
FIT TESTS FOR NEGATIVE PRESSURE RESPIRATORS

C-1. All negative pressure respirators must be fit tested using a qualitative or quantitative procedure. Respirators used for protection against lead and/or arsenic require quantitative (see para C-4) or special qualitative fit tests (see para C-5).

C-2. A qualitative or quantitative fit test will not be performed until the wearer has been instructed in adjustment of the respirator and is capable of obtaining a sucessful negative pressure test, and positive pressure test (if the respirator design allows positive pressure testing). If a half facepiece respirator is being fit and the wearer is required to use safety glasses in performing his/her job, the user must be fit tested while wearing safety glasses. All personnel administering fit tests must be trained.

a. Negative Pressure Test. Using the palm(s) of the hand(s) cover the respirator inlet(s) and inhale slowly. A slight negative pressure should be noticed in the facepiece if a good facepiece to face seal exists.

b. Positive Pressure Test. Using the palm of the hand cover the respirator exhalation outlet and exhale slowly. A slight positivepressure should be noticed in the facepiece if a good facepiece to face seal exists.

C-3. Qualitative Fit Tests. The following are two fit test procedures which can be performed at most job sites with minimal equipment:

a. Isoamyl Acetate (Banana Oil). This test relies on the users' ability to smell the organic vapor isoamyl acetate (banana oil). Air purifying respirators (to be fit by this method) must be equipped with organic vapor cartridges or canisters. Saturate a piece of fabric, cotton, or sponge with liquid isoamyl acetate and move it around the respirator worn by the person being tested. The banana oil should be passed close to potential leak points in the facepiece to face seal while the wearer carries out exercises such as normal breathing, turning the head side to side, nodding up and down, and talking. If the wearer does not detect the banana odor, remove the respirator and check if the wearer can detect the banana odor. If the wearer can detect the odor without the respirator but not when wearing it, a satisfactory fit has been achieved. If the wearer is unable to obtain a satisfactory fit after several readjustments of the straps, a different brand respirator should be tried.

b. Irritant Smoke Test. This test relies on irritant effect to the nose and throat of smoke produced by passing air over commercially prepared ventilation smoke tubes (CAUTION: THIS SMOKE IS AN EYE IRRITANT, THEREFORE, THE WEARER MUST KEEP HIS/HER EYES CLOSED DURING TESTING EVEN IF THE RESPIRATOR OFFERS EYE PROTECTION). Air purifying respirators (to be fit by this method) must be equipped with high efficiency filters. Since this method relies on irritant effects, the smoke should first be directed toward the respirator from a distance of about two feet. If the wearer does not detect the smoke, move it in slowly to within six inches of the respirator (CAUTION: BE SURE THAT THE ENDS OF THE SMOKE TUBE ARE COVERED WITH A RUBBER SHROUD TO PROTECT THE WEARER FROM THE JAGGED GLASS ENDS). The wearer should perform

exercises such as normal breathing, turning the head from side to side, nodding up and down, and talking. If the wearer does not detect the smoke, the wearer has achieved a satisfactory fit. If the wearer detects the smoke, stop immediately and readjust the respirator. If, after several adjustments, a satisfactory fit cannot be achieved, a different brand respirator should be tried.

C-4. Quantitative Fit Tests. Quantitative fit tests involve exposing the respirator wearer to an atmosphere of nontoxic vapor, gas, or aerosol in a test chamber. The concentration of the test agent is then measured both in the chamber and inside the respirator and the protection factor calculated. This method requires special equipment which varies from manufacturer to manufacturer. Therefore, all quantitative fit test should be performed according to the manufacturer's instruction. However, NO RESPIRATOR SHALL BE USED IN A WORK ATMOSPHERE THAT WILL REQUIRE A PROTECTION FACTOR GREATER THAN THOSE LISTED IN APPENDIX A regardless of the protection factor calculated by quantitative testing.

C-5. Special Qualitative Fit Tests. Special qualitative fit test procedures, permitted for fit testing respirators used for protection against lead, are listed in 29 CFR 1910, 1025, Lead Standard, Appendix C, as added by 47 FR 51117, November 12, 1982.

APPENDIX D
COMPRESSED BREATHING AIR

D-1. All compressed breathing air for industrial use must meet Type I, Grade D, Breathing Air Quality as defined by Compressed Gas Association Commodity Specification G7.1, 1973 and supplying compressors must be tested for the following air quality parameters at least semiannually:

Oxygen (by volume)	19.5-23.5%
Carbon monoxide (by volume)	20 ppm
Carbon dioxide (by volume)	1,000 ppm
Oil Mists	5 mg/m
Odor	Not objectionable or pronounced

D-2. Contracts for commercially procured compressed breathing air should include provisions for insuring air quality and cylinder pressure testing.

D-3. The user activity must make arrangements for testing air quality from in-house compressors used to supply breathing air. Breathing air compressor systems should be used; however, if plant air is used, the proper air purification and safety devices must be installed. The general requirements for systems supplying breathing air are:

a. The compressor inlet must be located in an area free from air contamination. If outside, areas near and down wind from exhaust ducts/stacks and sources of vehicle exhaust should be avoided. If inside, areas with little air circulation, high temperatures, solvent use, combustion equipment, or other potential sources of contamination should be avoided.

b. The compressor must have a compressor failure alarm and high temperature alarm or shut off.

c. A water trap and air purification system are required for the removal of condensed water, oil mist and other particulates, odors, gases and organic vapors.

d. A continous carbon monoxide alarm or carbon monoxide converter should be used; if not, the air must be monitored for carbon monoxide at least monthly.

e. The air receiver must be of sufficient capacity to allow respirator wearer(s) to escape from a contaminated atmosphere in the event of compressor failure.

f. Should plant air be used, only breathing air type lines are permitted downstream from the purification system.

g. During filling, air cylinders should be immersed in water for cooling and shielded from the operator in case of cylinder rupture.

h. Air cylinders must be inspected and hydrostatically tested every five years.

j. Maintenance should be performed on the compressor and purification system in accordance with manufacturer's guidelines. This should include calibration (operational check with a span gas (a gas with a known concentration)) of the carbon monoxide alarm if used. The alarm should be set for 20 ppm. Records of preventive maintenance, repairs, and calibration to include the nature of the work, the date, and name of the person performing the work should be kept for one year.