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OCCUPATIONAL AND ENVIRONMENTAL HEALTH

RESPIRATORY PROTECTION PROGRAM

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OCCUPATIONAL AND ENVIRONMENTAL HEALTH

RESPIRATORY PROTECTION PROGRAM

Note: This bulletin will be restructured in the future and republished as a technical bulletin (TB MED) and a DA Pamphlet. The TB MED will contain all medical aspects of the respiratory protection program (e.g., wearer factors, fitting, surveillance). The DA Pamphlet will include the organizational and physical aspects of the program.

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CHAPTER 1

GENERAL

1-1. Purpose. This bulletin provides information and guidance necessary to insure that the respiratory protection programs of the Department of the Army (DA) and Defense Logistics Agency (DLA) are consistent with Occupational Safety and Health Administration (OSHA) standards. This document outlines the minimal acceptable requirements for a respiratory protection program, delineates responsibilities, provides selection criteria in determining respiratory protection needs, and lists currently approved respiratory protective devices. This bulletin implements the provisions of Title 29, Code of Federal Regulations (CFR), Section 1910.134, Respiratory Protection.

1-2. Scope. This bulletin is applicable to all Active Army, US Army Reserve, US Army National Guard, and DLA elements worldwide whose military and civilian personnel are performing duties requiring the use of respiratory protection to prevent unnecessary exposure to airborne concentrations of toxic materials equal to or greater than the permissible limits established in existing Federal, DOD, and Army occupational safety and health standards or criteria.

1-3. References. A listing of references is contained in appendix A.

1-4. Definitions. For the purpose of this bulletin, the following definitions apply:

a. Approved. Tested and listed as satisfactory by the National Institute for Occupational Safety and Health (NIOSH), or the Mine Safety and Health Administration (MSHA).

Note: Effective 24 March 1978, 43 Federal Register (FR) 12312 changed the title of Title 30 CFR, Chapter I, to reflect the transfer of functions from the Mining Enforcement and Safety Administration (MESA), Department of the Interior, to the MSHA in the Department of Labor. The acronym "MESA" is deleted and the acronyn "MSHA" is substituted in specific sections.

b. Contaminant. A harmful, irritating, or nuisance material in concentrations exceeding those normally found in the ambient air.

c. Disinfection. The destruction of pathogenic organisms, especially by means of chemical substances.

d. Dusts. Solid particles, mechanically produced, with a size ranging from submicroscopic to macroscopic.

e. Emergency. An unplanned event when a hazardous atomosphere of unknown chemical or particulate concentration suddenly occurs, requiring immediate use of a respirator for escape from or entry into the hazardous atmosphere to carry out maintenance or some other task.

Note. This may or may not include cleanup, maintenance, or repair in *unknown* concentrations or oxygen deficiency.

f. Evacuation or escape. An unplanned event when a hazardous atmosphere of unknown chemical or particulate concentration suddently occurs, requiring immediate use of a respirator for exiting the area only.

Note: This *does not* include cleanup, maintenance, or repair in unknown concentrations or oxygen deficiency.

g. Fumes. Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, with a size usually less than 1 micrometer in diameter.

h. Gases. Substances which are gaseous at ordinary temperatures and pressures.

i. Immediately dangerous to life or health. A condition posing an immediate threat to life or health, or an immediate threat of severe exposure to contaminants likely to have adverse delayed effects on health. This condition includes atmospheres where oxygen content by volume is less than 16 percent.

j. Installation medical authority. The DA medical authority is the commander of the installation US Army Medical Center/US Army Medical Department Activity (MEDCEN/MEDDAC), or his designated representative. The DLA medical authority is the Command Medical Officer.

k. Mists. Suspended liquid droplets generated by condensation or by breaking up of a liquid with a size ranging from submicroscopic to macroscopic.

l. Oxygen-deficient atmosphere. An atmosphere containing 19.5 percent or less oxygen by volume.

m. Particulate matter. A suspension of fine solid or liquid particles or fibers in air, such as dust, fog,

fume, mist, smoke, or sprays.

n. Pneumoconiosis-producing dust. Dust which, when inhaled, deposited, and retained in the lungs, may produce signs, symptoms, and findings of pulmonary disease.

o. Radon daughters. Particulate decay products (^{218}Po (RaA), ^{214}Pb (RaB), ^{214}Bi (RaC), ^{214}Po (RaC^{1})) of radon (^{222}Rn).

p. Respirator. An approved device designed to provide the wearer with respiratory protection against inhalation of airborne contaminants and, for some devices, oxygen-deficient atmospheres.

q. Respiratory minute volume. The amount of air inspired per minute.

r. Shall. Indicates a requirement that is essential to meet the currently accepted standards of protection or Federal rules and regulations.

s. Should. Indicates an advisory recommendation that is to be applied when practicable.

t. Vapor. The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

CHAPTER 2

THE RESPIRATORY PROTECTION PROGRAM

2-1. General requirements. *a.* The installation commander shall insure that a respiratory protection program conforming with the requirements of this document is established.

b. Respirators are considered an acceptable method of protecting the health of DA or DLA personnel only under the following circumstances:

(1) When it has been determined to the satisfaction of the installation medical authority that there are no feasible engineering or work practice controls that can be used to adequately control the hazard.

(2) During intermittent, nonroutine operations (i.e., not exceeding 1 hr/day for 1 day/week).

(3) During the interim periods when engineering controls are being designed and/or installed.

(4) During emergencies.

c. The installation medical authority shall evaluate respiratory hazards, identify locations or areas where respiratory protection is required and provide guidance in the conduct of the installation respiratory protection program.

d. Commanders or personnel in charge of operating activities will insure that their personnel are provided with approved respirators (without cost to the worker) after the requirement has been identified by the installation medical authority or personnel under his direction. Respirators (such as rocket propellent gas masks), procured under military or Federal specifications for protection against a contaminant or contaminants for which there is no NIOSH or MSHA schedule, may be used for specific applications involving the specific contaminant or contaminants for which a specification is given with concurrence of the installation medical authority (para 2-2*k*).

e. Individuals provided with respirators shall use them in accordance with instructions and training received (para 2-2*c*).

f. Installation Safety Managers, in coordination with the installation medical authority, shall conduct regular inspections and evaluations to determine the continued effectiveness of the respiratory protection program. The installation medical authority shall reevaluate respiratory hazards, as appropriate, to insure that the respiratory protection provided is adequate.

g. Military protective field masks designed and issued for protection against field concentrations of **chemical, biological, and radiological warfare agents** shall not be used in industrial applications unless they are also approved respirators.

2-2. Minimum acceptable Respiratory Protection Program. An effective respiratory protection program requires close liaison among workers, supervisors, safety, and medical personnel to safeguard life and health through proper selection and use of respirators. It includes the following elements:

a. Written standard operating procedures governing the selection and use of respirators shall be established (paras 2-3 and 2-6*c*(1)).

b. Respirators shall be selected on the basis of the hazards to which the worker is exposed (para 2-4).

c. The user shall be instructed and trained in the proper use of respirators and their limitations (paras 2-6 and 2-7).

d. Where practicable, the respirators should be assigned to individual workers for their exclusive use (para 2-4).

e. Respirators shall be regularly cleaned and disinfected. Those issued for the exclusive use of one worker should be cleaned after each day's use, or more often if necessary. Those used by more than one worker shall be thoroughly cleaned and disinfected after each use (para 2-8*e*).

f. Respirators shall be stored in a convenient, clean, and sanitary location (para 2-8*g*).

g. **Respirators used routinely shall be inspected** during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use, such as self-contained devices, shall be thoroughly inspected at least once a month and after each use (para 2-8).

h. Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained (para 2-10).

i. The continued effectiveness of the program shall be determined by regular inspections and evaluations (para 2-8*d*).

j. Persons shall not be assigned to tasks requiring use of respirators unless it has been determined that

they are physically able to perform the work and use the equipment. The local physician shall determine which health and physical conditions are pertinent. The respirator user's medical status shall be reviewed periodically (for instance, annually) (para 2-10).

k. Only approved or accepted respirators shall be used. The respirator furnished shall provide adequate respiratory protection against the particular hazard for which it is designed in accordance with standards established by competent authorities.

2-3. Standing operating procedures. Written standing operating procedures (SOP) shall be prepared including all information and guidance necessary for proper respirator selection, use, care, and maintenance. Possible emergency and routine uses of respirators should be anticipated and planned for. Written procedures shall be prepared covering the safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators. Any respiratory SOP should be prepared by supervisory personnel with the assistance and approval of installation safety and medical authorities.

2-4. Selection and use of respiratory protective devices. The correct respirator shall be specified for each job. The installation medical authority or personnel under his guidance or in the case of DLA, the safety and health staff shall, on the basis of environmental evaluations and/or requirements set forth in 29 CFR 1910, Subpart Z, for specific substances, determine the type of respiratory protective device best suited for the task. Also, refer to section III, appendix B, for additional guidance in respirator selection. The individual issuing respirators shall be adequately instructed to insure that the correct respirator is issued. Each respirator permanently assigned to an individual shall be durably marked to indicate to whom it was assigned. This mark shall not affect the respirator performance in any way. The date of issuance shall be recorded. Respirator selection and use shall take into account health and safety factors, such as nature of the hazard, intended uses and limitations of respiratory protective devices, movement and work-rate limitations, emergency escape time and distance requirements, and training requirements. The human factor must also be considered since the effectiveness of the respiratory protection program can largely be determined by the degree of worker acceptance. Worker acceptance of respirators is influenced by comfort; ability to breathe without objectionable resistance; adequate visibility under all conditions; provisions for wearing prescription lenses, if necessary; ability to communicate; ability to perform all tasks without undue interference; confidence in the facepiece fit; and convincing evidence that a respirator is necessary and that appropriate action is being taken, where possible, to eliminate the need for respiratory protective equipment.

2-5. Classification and description of respirators. Industrial respiratory protective devices have been designed, tested, and approved for protection against specific industrial exposures. These devices are conveniently grouped into two general classifications according to mode of operation. A detailed description is provided in appendix B.

a. Air-purifying respirators.

(1) Gas masks and chemical cartridge (gases and vapors).

(2) Particulates (dusts, fog, fume, mist, smoke, and sprays).

(3) Combination gas, vapor, and particulate.

b. Atmosphere supplying respirators.

(1) Self-contained.

(2) Hose-mask.

(3) Air line.

(4) Combination self-contained and hose-mask or air line.

2-6. Selection and Limitations of respirators. *a.* The degree of respiratory hazard, as it refers to the selection and classification of respirators, depends upon the atmospheric oxygen concentration; contaminant's physical state, toxicity, and concentration; the presence of other contaminants or stress factors in the working environment; and worker exposure time and susceptibility. Respiratory hazards may be classified as gas and vapor contaminants (immediately or not immediately dangerous to life or health), particulate contaminants (immediately or not immediately dangerous to life or health), and oxygen deficiencies. Each classification requires a different degree of respiratory protection. Appendix B describes respiratory protective devices and limitations. A guide for the selection of the proper respiratory protective device is provided in table 1, appendix B. Table 2, appendix B, provides a list of tested and approved respiratory protective devices. Table 3, appendix B, lists air purifying respirators and gas masks available in the Federal supply system. An updated list of approved respirators and

information concerning the availability of air-supplied respirators within the Federal supply system will be maintained by the US Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD 21010. A guide to the identification of gas mask canisters is included in appendix C.

b. The importance of proper respirator selection is emphasized by the fact that improperly fitted or improperly selected respiratory protective devices, and devices with deteriorated or depleted canisters or cartridges, may provide reduced respiratory protection. In addition, inadequate protection may be provided against eye hazards such as projectiles; ultraviolet, infrared, or intense visible light; or eye irritants (para 2-4). Precautions must be taken also to insure acceptable air quality (para 2-12*c*). So that air supplied to hose-mask, air line, or self-contained respirators is not contaminated with carbon monoxide, oil, or other contaminants.

c. Respirator selection and use in atmospheres immediately dangerous to life or health (includes additional personnel requirements).

(1) User activities will prepare a written SOP for safe use of respirators. These procedures will be reviewed and approved by the installation safety and health personnel.

(2) If it is probable that atmospheres immediately dangerous to life or health may occur, then both the normally expected inward leakage and the reliability of the respirator shall be given full consideration. It is essential that in highly toxic atmospheres, inward leakage, if any, be minimal. In oxygen-deficient atmospheres with no toxic materials, inward leakage is normally not a problem unless the leakage exceeds a few percent. The recommended respirator types are listed in table 1, appendix B.

(a) In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional person shall be present with suitable rescue equipment in the form of self-contained breathing apparatus and protective clothing. Communications (visual, voice, or signal line) shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of emergency.

(b) When self-contained breathing apparatus are used in atmospheres immediately dangerous to life and health, standby personnel shall be present with suitable rescue equipment.

(3) Air line respirators are not approved for use in immediately dangerous atmospheres unless an auxiliary self-contained air supply or an air storage receiver with an alarm is also provided because no respiratory protection is provided if the air supply fails. The alarm for the storage receiver should be an audible or visual alarm, or combination, that is discernible from other alarms. The alarm(s) should be positioned so the respirator wearer and/or the standby personnel can recognize the alarm when activated. The alarm should have a mechanism that is tested prior to work in an immediately hazardous to life and health atmosphere. If conditions preclude use of the recommended types of respirators, air line respirators may be considered for use provided an adequate flow of respirable air is maintained and the conditions listed below are met.

(a) Persons using air line respirators in atmospheres immediately dangerous to life or health shall be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other equivalent provisions for the rescue of persons from hazardous atmospheres shall be used.

(b) Standby personnel with suitable self-contained breathing apparatus shall be located at the nearest fresh air base for emergency rescue.

(c) The air supply hose from a compressor or cylinder air supply will be protected from damage, including cutting, kinking, crushing, or burning. In some cases an armored hose will be used. Hose couplings will be protected against disconnection. Trailing air line hose shall be arranged to minimize tripping and to permit ready escape.

(d) The cylinder air supply shall meet the requirements specified in paragraph 2-12*c*. Oxygen must never be used with air line respirators.

(e) The compressor for supplying air shall conform with the requirements of paragraph 2-12*d*.

d. If immediately dangerous atmospheres are not present or cannot occur, the consequences of respirator failure are lessened and emphasis can be placed on other factors such as long-term protection, convenience, cost, comfort, and wearer acceptance. These factors should be weighed against one another since they are not always compatible. However, long-term protection should be given priority over all other factors. Long-term protection is determined primarily by the amount of inward leakage of atmospheric contaminants during normal usage of the respirator.

e. Other considerations for respirator selection.

(1) *Exposure time.*

(a) Work time usually determines the length of time for which respiratory protection is needed, including the time necessary to enter and leave a contaminated area. A self-contained breathing apparatus, gas mask, or chemical-cartridge respirator provides respiratory protection for relatively short periods. The hose mask with blower, air line respirator, and other supplied-air respirators provide protection for as long as the facepiece is supplied with adequate respirable air. Particulate-filter respirators can provide protection for long periods, without need for filter replacement, only if the atmospheric particulate loading is low. Therefore, for protracted periods of use, the hose mask with blower and air line respirators offer definite advantages. They also cause less discomfort than air purifying respirators.

(b) Some respirators have a means for indicating the remaining service life. Some type of warning is available for all self-contained breathing apparatus and a few gas masks. This may be a pressure gauge, timer, audible or physical alarm, or window indicator in the canister. The user should understand the operation and limitations of each type of warning device. Most other gas masks and chemical-cartridge respirators have no indicator of remaining service life. Canisters and cartridges should be changed according to the manufacturer's directions or on the basis of canister breakthrough data if available.

(2) *Activity of wearer.* The work area to be covered, work rate, and mobility required of the wearer in carrying out his work should be considered in respirator selection.

(a) Air purifying respirators present minimal interference with the wearer's movement. Supplied-air respirators with trailing hoses severely restrict the area the wearer can cover and present a potential hazard where the trailing hose can come in contact with machinery. Self-contained breathing apparatus present a size and weight penalty which may restrict climbing and movement in tight places.

(b) The wearer's work rate determines his respiratory minute volume, maximum inspiratory flow rate, and inhalation and exhalation breathing resistance. The respiratory minute volume is of great significance in self-contained and air line respirators operated from cylinders since it determines their operating life. Useful life under moderate work conditions may be one-third that under rest conditions.

(c) Peak airflow rate is important in the use of constant-flow, air line equipment. The air-supply rate should always be greater than the peak inspiratory flow rate to maintain the respiratory enclosure under positive pressure.

(d) High breathing resistance of air purifying respirators under conditions of heavy work can result in distressed breathing.

(3) *Unusual hazards.* Unique factors, which may add additional dimensions to the hazard potential and must be considered when selecting respirators include, for example, skin absorption of the contaminant, skin irritation, eye irritation, and radiation of skin or whole body.

(4) *Vision.* All facepieces will restrict, to some degree, the wearer's vision. This may increase accident potential. Other problems include wearing of prescription glasses and fogging of the respirator lens (para 2-7*b*(3) and (6)*(a)* below).

(5) *Communications.* Effective speech communication may be required in jobs for which the respirator is being selected. Conventional respirators distort the human voice. The respirator valve usually provides a pathway for some speech transmission over short distances in relatively quiet areas. However, talking can induce facepiece or component leakage and should be limited while wearing a respirator. Mechanical and/or electrical speech transmission devices which eliminate these problems are available.

(6) *Low temperatures.*

(a) Major problems in the use of full facepieces at low temperatures are poor visibility and freezing of exhalation valves. All full facepieces are designed so that the incoming fresh air sweeps over the inside of the lens to reduce fogging. Otherwise, it would be impossible to wear a full facepiece in ordinary room temperatures without severe fogging. Antifog compounds can be used to coat the inside of the lens to prevent fogging at room temperatures and down to temperatures approaching 0 degrees Fahrenheit. However, below 0 degrees Fahrenheit, antifog compounds will not prevent severe fogging.

(b) Full facepieces are available with nose cups that direct moist exhaled air through the exhalation valve. A properly fitting nose cup should provide satisfactory or adequate visibility at temperatures down to minus 30 degrees Fahrenheit.

(c) At very low temperatures, the exhalation valve may collect moisture and freeze open, allowing the wearer to breath contaminated air, or freeze closed, preventing normal exhalation. The Bureau of Mines has published two pamphlets on this subject: *Performance of Open Circuit Self-Contained Breathing Apparatus at Minus 25° F* and *Low-Temperature Performance of Compressed-Oxygen*

Closed-Circuit Breathing Apparatus. Dry respirable air will be used with self-contained breathing apparatus or air line respirators at low temperatures. The dewpoint of the breathing gas shall be appropriate to the ambient temperature.

(d) High pressure connections on self-contained breathing apparatus may leak because of metal contraction at low temperatures. The connections should not be overtightened since they may break when the temperature returns to normal.

(e) Ideally, air supplied to respirators should be warmed to at least 40° F.

(7) *High temperatures.* A man/woman working in areas of high ambient or radiant temperature is under stress. Any additional stress resulting from use of respirators should, therefore, be minimized. This can be done by selecting and using respirators having minimum weight and breathing resistance. Supplied-air respirators, hoods and suits having an adequate supply of cool breathing air are recommended. Further information on the use of respirators in high temperatures may be found in *A Fire Officer's Guide to Breathing Apparatus for the Fire Service,* published by the National Fire Protection Association (NFPA).

2-7. Training, face-fit, and leak-testing. Commanders shall insure that personnel required to use or to supervise personnel using respiratory protective devices are provided training as outlined in paragraph *a* below.

a. Training. Unless the reasons for the use of respirator protective devices and instructions on proper selection, use, and maintenance are thoroughly understood, and ongoing training provided, the devices may not be used or may not work properly. Both supervisors and workers shall be instructed by competent persons knowledgeable in the area of respiratory protection. Training shall provide individuals an opportunity to handle the respirator, have it fitted properly, test its facepiece-to-face seal, wear it in normal air for a long familiarity period, and finally to wear it in a test atmosphere. Minimum training shall include:

(1) Instruction in the nature of the hazard, whether acute, chronic, or both, and a frank appraisal of what may happen if the respirator is not used.

(2) Explanation of why more positive engineering or process-oriented controls are not immediately feasible to reduce or eliminate the need for respirators.

(3) A discussion of why this is the proper type of respirator for the particular purpose (app B).

(4) A discussion of the respirator's capabilities and limitations (app B).

(5) Periodic instruction and training in actual use of the respirator (preferably annually for emergency use respirators). Training should also include recognition of the end of the service life of cartridges/canisters or filters (e.g., smelling organic vapors through the cartridge/canister, manufacturer specified termination date, or an increase in breathing resistance).

(6) Classroom and field training to recognize and cope with emergency situations.

(7) Detailed instructions on cleaning and maintenance of the respirator (para 2-8).

(8) Any special training required for unique uses. Training for use of respiratory protective devices for firefighters will continue to be conducted by fire department personnel in close coordination with the medical authority.

b. Face-fit and leak-testing. Every respirator wearer shall receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly.

(1) Respirators are generally uncomfortable to wear. If a good facepiece-to-face seal can be obtained only by very tight strap tension, the respirator shall not be worn for prolonged periods and its use shall be avoided. Even though maximum breathing resistant is specified by NIOSH, there are differences among approved respirators and one type may be more acceptable to the worker than another. Facial structure varies considerably from one individual to another, and since a given respirator is usually made only in one size, a successful fit cannot always be achieved for all persons. Different sizes of the same model or different models of approved respirators may have to be obtained to provide employees adequate respiratory protection. Local purchase of respirators is authorized and shall be made when necessary in order to obtain an acceptable face fit.

(2) Before initial use, each respirator shall be properly fitted, leakage tests performed, and the facepiece-to-face seal tested in a realistic test situation. Records of fit tests shall be maintained locally at the installation level. These records shall, as a minimum, contain date of fit test, name of individual tested, make and model of each respirator tested and the results of each test. This test is not required when replacement respirators from the same manufacturer and the same size are obtained ((7) below).

(3) Proper fitting of respiratory protective devices for individuals wearing corrective spectacles or goggles is a problem. A proper seal cannot be established if the temple bars or straps extend through the sealing edge of the facepiece. As a temporary measure, spectacles with short temple bars or without temple bars may be taped to the wearer's head. Contact lenses shall not be worn in a hazardous environment without appropriate covering safety eyewear. Contact lenses shall not be allowed for use with respirators equipped with full facepiece, helmet, hood, or suit. 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 face. Systems or kits for mounting corrective lenses inside full facepieces can be purchased with the facepiece. When a workman must wear corrective lenses as part of the facepiece, the facepiece and lenses shall be fitted by qualified individuals to provide good vision, comfort, and a gas-tight seal. Corrective lenses may be procured under the provisions of AF 385-32 or chapter 10, DLAM 1000.1.

(4) Each time the wearer puts on the respirator, positive and negative pressure tests shall be conducted to insure a satisfactory face fit. Respirators shall not be worn nor will workers be permitted to perform tasks that require respiratory protection when conditions such as a growth of beard, sideburns, a skull cap that projects under the facepiece, temple pieces on corrective spectacles or goggles, or the absence of one or both dentures prevent a good facepiece-to-face seal. When a specific model or type of respirator is first issued, proper facepiece-to-face seal shall be demonstrated by having the user wear the respirator in a realistic test atmosphere ((5) below).

(a) Positive pressure test. Close the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators, this method of leak testing requires the wearer to first remove the exhalant valve cover and then carefully replace it after the test.

(b) Negative pressure test. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

(5) The iso-amyl acetate (banana oil; NSN 6810-00-174-6604) vapor test is used principally for testing the facepiece seal of chemical cartridge/canister respirators. The facepiece-to-face seal of particulate-filter respirators may be tested by adapting organic vapor cartridges/canisters to the respirator, or by attaching a bag to the facepiece so as to enclose both inhalant and exhalant valves. An iso-amyl acetate vapor concentration of approximately 100 ppm can be prepared in a vacant room, a special chamber, box, or bag, without damage to its contents or the enclosure by evaporating three drops of iso-amyl acetate from an eyedropper for each 100 cubic feet of space. The face fit is consideded satisfactory if the wearer can enter and remain in the test atmosphere for a minute or two without detecting the odor of iso-amyl acetate. If detected, the wearer should retreat to uncontaminated air, check the respirator, and readjust the face fit, then reenter the test atmosphere. Field tests may be conducted by moving a cotton swab containing one or two drops of iso-amyl acetate around the periphery of the facepiece while the wearer breathes normally. If the odor of iso-amyl acetate is detected, the wearer should check the respirator, readjust the face fit, and repeat the test. In either case above, if leakage is still noted, the particular respirator will not adequately protect the wearer.

(6) Quantitative fit testing of respirators is required by OSHA and, therefore, DA and DLA for selected airborne contaminants (refer to 29 CFR 1910). These systems generate atmospheres of some test substance and continuously monitor the internal (inside mask) and external concentrations so that accurate protection factors can be determined. Quantitative fit testing is the preferred method for all negative pressure respirator device fit testing. Installations having large respirator programs should consider procuring systems that quantitate respirator face-fit effectiveness.

Note. Dioctyl phthalate (DOP) as a test substance is not recommended for quantitative face fit testing. This recommendation is based on the current uncertainty of the toxicity of DOP and/or its decomposition products.

(7) Local records of respirator training, face-fit and leak testing shall be kept for at least the duration of employment or as specified by specific contaminant exposure (refer to 29 CFR 1910). These records shall include the following minimal information:

(a) Name, social security number (or other identifying worker number).

(b) Job title.

(c) Office symbol, work location, supervisor's name.

(d) Date of training or testing.

(e) Date of medical evaluation.

(f) Type of respirator tested.

(g) Results of respirator fitting tests.

(h) Success or failure of person to obtain a satisfactory fit if a qualitative fitting test was performed.

(i) Respirator protection factor based upon test results if a quantitative respirator fitting test was performed.

(j) Name of person performing the training or testing.

(k) The presence of facial hair, long hair or side burns, etc.

(l) Wear's need for glasses or other eye protection.

(m) Other pertinent information.

Records should be identified to allow for cross-referencing with worker contaminant exposure data (sampling data).

(8) Locally designed respirator user cards should be issued to individuals who have been trained, fitted, and medically evaluated to use respirators. A respirator user card should indicate:

(a) Name or other worker identifying number.

(b) A statement that "_____ has been trained, fitted, and medically evaluated to use the respirator(s) indicated."

(c) The respirator(s) for which the cardholder may be issued.

(d) The expiration date.

2-8. Maintenance and care of respirators. When respirators are issued to individuals, the individual is responsible for primary maintenance and care of his/her respirator. Where respirators are used collectively or kept ready for emergencies by a shop or operating activity, the commander or supervisor of the activity is responsible for establishing a respirator maintenance and cleaning program. This program shall be adjusted for the number of types of respirators in use, working conditions and hazards involved, and shall include the basic services: inspection for defects (including a leak check), cleaning and disinfecting, repair, and storage. Equipment shall be properly maintained to retain its original effectiveness.

a. All respirators shall be inspected routinely before and after each use. A respirator that is not routinely used but kept ready for emergency use shall be inspected after each use and at least monthly to assure that it is in satisfactory working condition.

b. Self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be fully charged according to the manufacturers' instructions. It shall be determined that the regular and warning devices function properly.

c. Respirator inspection shall include a check of the tightness of connections and the condition of the facepiece, headbands, valves, connecting tube, and canisters. Rubber or elastomer parts shall be inspected for pliability and signs of deterioration. Stretching and manipulating rubber or elastomer parts with a massaging action will keep them pliable and flexible, and prevent them from hardening or stiffening during storage.

d. The user activity shall keep a record of inspection dates, findings, and corrective actions for respirators maintained for emergency use.

e. Respirators issued to specific individuals shall be collected, cleaned, and disinfected as frequently as necessary to insure that skin penetrating and dermatitis-causing contaminants are removed from respirator surfaces. Respirators maintained for emergency use or used by more than one person shall be cleaned and disinfected after each use.

(1) The following procedure is recommended for cleaning and disinfecting respirators:

(a) Remove any filters, cartridges, or canisters.

(b) Wash facepiece and breathing tube in a cleaner-disinfectant solution. A brush may be used to facilitate dirt removal.

(c) Rinse completely in clean, warm water.

(d) Air dry in a clean area.

(e) Clean other respirator parts as recommended by the manufacturer.

(f) Inspect valves, headstraps, and other parts; replace defective parts with new ones.

(g) Insert new filters, cartridges, or canisters periodically as specified by the manufacturer; make sure seal is tight.

(h) Place in plastic bag or other closed container for storage.

(2) Cleaner-disinfectant solutions may be commerically prepared solutions, which are followed by a clean, warm-water rinse and air dried; or respirators may be washed in a liquid detergent solution. After washing, additional disinfection may, if desired, be provided by dipping the mask in one of the following disinfectant solutions, followed

by rinsing and air drying.

(a) Hypochlorite solution (50 ppm chlorine) for 2 minutes.

(b) Aqueous iodine solution (50 ppm iodine) for 2 minutes.

(3) Hypochlorite and iodine solutions or iodine compounds can damage respirator parts by aging rubber and corroding metal parts if immersion times are extended. Solvents (except as prescribed in (4) below), temperatures above 185 degrees F., and vigorous mechanical agitation should be avoided.

(4) Respirators contaminated with organic phosphate pesticides should be decontaminated by an alkaline soap wash and 50 percent isopropyl or ethyl alcohol rinse followed by the normal cleaning procedure.

f. Replacement or repair shall be done only by experienced persons using parts designed for the respirators. No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations. Reduction or admission valves or regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair.

g. Respirator storage shall be as follows:

(1) After inspection, cleaning, and necessary repair, respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals and other contaminants. Respirators placed at stations and work areas for emergency use should be stored in compartments built for that purpose, clearly marked to indicate the content, and must be quickly accessible at all times. Routinely used respirators, such as dust respirators, may be placed in plastic bags. Respirators should not be stored in such places as lockers or tool boxes unless they are in containers or cartons.

(2) Respirators shall be packed or stored so the facepiece and exhalation valve will not be damaged by being subjected to crushing or cramming.

(3) Instructions for proper storage of emergency respirators, such as gas masks and self-contained breathing apparatus, are found in "use and care" instructions usually mounted inside the carrying case lid.

2-9. Routine inspections. *a.* Respiratory protection is no better than the respirator in use, even though it is worn conscientiously. Frequent random inspections shall be conducted by a qualified individual to assure that respirators are properly selected, used, cleaned, and maintained.

b. Respirators used routinely will be inspected during cleaning. Experienced personnel shall replace worn or deteriorated parts with parts designed for the respirator. No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations. Reducing admission valves or regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair. Respirators for emergency use, such as self-contained devices, shall be thoroughly inspected at least once a month and after each use, and a written record kept of inspection dates and findings.

2-10. Medical evaluation of worker. Workers shall not be assigned to tasks requiring the use of respirators unless it has been determined by medical evaluation that they are physically and physiologically able to perform their work while wearing the prescribed respiratory protection. This medical evaluation should consist of pulmonary function screening, including as a minimum the determination of the forced expiratory volume in 1 second (FEV_1) and the forced vital capacity (FVC). It may also include other procedures, such as tests of the cardiovascular and respiratory systems, which the medical examiner considers useful in evaluating the ability to use respirators. It should be noted that pulmonary function tests (PFT) are useful in this evaluation only as a screening tool. Abnormal PFT in and by themselves are not grounds for disqualification. In the event abnormal PFT are noted, the worker's medical history, the worker's age, the nature of the work to be performed while wearing a respirator, the type of respirator to be employed, the results of other tests of cardiovascular and respiratory status, and a "use" test should be considered before disqualifying the worker for respirator use. The medical status of the respirator user should be reviewed periodically.

2-11. Bioassay. When respiratory protection is used to control individual exposure to radioactive materials, all provisions of 10 CFR 20 shall be followed by the Nuclear Regulatory Commission (NRC) licensee to include verification of the effectiveness of the program by a routine bioassay program performed by an accredited laboratory. Bioassay services are available from the US Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD 21010. Except as authorized by the NRC, no allowances may be made for radioactive particle size or for the protective clothing or equipment in determining whether an individual was exposed to excessive concentrations (AR 40-14/DLAR 4145.24). (See NRC Regulatory Guide

8.15, Acceptable Program for Respiratory Protection.)

2-12. **Air quality.** Compressed air, compressed oxygen, liquid air and liquid oxygen used for respiration shall be of high purity.

a. Cylinders shall be tested and maintained as prescribed in the Shipping Container Specifications of the Department of Transportation (49 CFR 178).

b. Oxygen shall meet the requirements of the United States Pharmacopeia for medical or breathing oxygen: Oxygen at least 99 percent, carbon dioxide less than 300 ppm, carbon monoxide less than 10 ppm, and nitric oxide and nitrogen dioxide less than 5 ppm. Compressed oxygen shall not be used in supplied air respirators or in open circuit self-contained breathing apparatuses that have previously used compressed air. Oxygen must never be used with air line respirators.

c. Breathing air for respirators may be supplied from cylinders or air compressors. It shall meet at least the requirements of the specification for Grade D breathing air as defined in American National Standards Institute (ANSI) Standard Z86.1/ Compressed Gas Association (CGA) Specification G-7.1, viz.: oxygen 19.5-23.5 percent, hydrocarbons (condensed) less than 5 mg/m^3, carbon monoxide less than 20 ppm, and carbon dioxide less than 1000 ppm.

d. The compressor for supplying breathing air shall be equipped with necessary safety and standby devices as stated below. Compressors shall be constructed and situated so as to avoid entry of contaminated air into the system. Suitable in-line air purifying sorbent beds and filters shall be installed and maintained to further assure breathing air quality. An air storage receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in event of a compressor failure, and alarms to indicated compressor failure and/or overheating shall be installed in the system. When feasible, oil-free compressors should be procured when obtaining additional or replacing existing compressors used for supplying breathing air. If an oil-lubricated compressor is used, it shall have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used, the air from the compressor should be tested for carbon monoxide at least monthly, or more frequently as indicated, to insure that it meets air quality specifications. Accurate records of these test results should be maintained by the appropriate user surveillance organization. For activities having difficulty in acquiring breathing air alarm systems, breathing air will be sampled prior to use and every 4 hours during use with NIOSH approved direct reading carbon monoxide indicator tubes or commercially available direct reading instruments. If carbon monoxide levels exceed 10 ppm, operations will be stopped until corrective action is taken. Accurate records of these sampling results will be maintained.

e. Air line couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with nonrespirable gases or oxygen. Installation areas having heavy piping or outlet areas with more than one type of gas system should be properly marked with labels, signs, and/or color code connectors to further prevent attempts to connect to nonrespirable air supplies.

f. Breathing gas containers shall be marked in accordance with American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained, Z48.1-1954; Federal Specification BB-A-1034a, June 21, 1968, Air, Compressed for Breathing Purposes; or Interim Federal Specification GG-B-00675b, April 27, 1965, Breathing Apparatus, Self Contained.

APPENDIX A

REFERENCES

AR 40-5, Health and Environment.
AR 40-14/DLAR 4145.24, Control and Recording Procedures for Occupational Exposure to Ionizing Radiation.
AR 310-25, Dictionary of United States Army Terms.
AR 385-32, Protective Clothing and Equipment.
Defense Logistics Agency (DLA) Manual 1000.1, DLA Safety and Health Manual.
Federal Specification BB-A-1034a, Compressed Air for Breathing Purposes, 21 June 1968.
Interim Federal Specification GG-B-00675b, Self-Contained Breathing Apparatus, 27 April 1965.
Title 10, Nuclear Regulatory Commission, Code of Federal Regulations (CFR), Part 20, Standards for Protection Against Radiation.
Title 29, Department of Labor (DOL), CFR, Part 1910, Occupational Safety and Health Standards.
Title 30, DOL, CFR, Part I, Mine Safety and Health Administration, Establishment and Use of Official Emblem.
Title 30, DOL, CFR, Part II, Respiratory Protection Devices; Test for Permissibility; Fees.
Title 49, Department of Transportation, CFR, Part 178, Shipping Container Specifications.
American National Standards Institute (ANSI) Standard Z48.1/Compressed Gas
Association (CGA) C-4-1954, Method of Marking Portable Compressed Gas Contained to Identify the Material Contained.
ANSI Standard Z86.1-1973/CGA Specification G-7.1, Commodity Specification for Air.
ANSI Standard Z88.1-1969, Safety Guide for Respiratory Protection Against Radon Daughters.
ANSI Standard Z88.2-1980, Practices for Respiratory Protection.
National Fire Protection Association (NFPA) Publication NFPA No. FSP-29B, Fire Officer's Guide to Breathing Apparatus for the Fire Service.
ANSI Standard Z88.5-1973, Practices for Respiratory Protection for the Fire Service.
NIOSH Certified Equipment List, US DHEW (NIOSH) Publication No. 79-107.
NIOSH, A Guide to Industrial Respiratory Protection.
E. J. Kloos, et al., "Performance of Open-Circuit Self-Contained Breathing Apparatus at Minus 25°," US Bureau of Mines, Report of Investigations 7077 (1968).
E. J. Kloos, et al., "Low-Temperature Performance of Compressed-Oxygen Closed-Circuit Breathing Apparatus," US Bureau of Mines, Report of Investigations 7192 (1968).
United States Pharmacopeia, 19th ed. (1974).
Nuclear Regulatory Guide 8.15, Acceptable Program for Respiratory Protection.

APPENDIX B

DESCRIPTION AND LIMITATIONS OF RESPIRATORY PROTECTIVE DEVICES

Section I. AIR PURIFYING RESPIRATORS

B-1. General description. Half-mask facepiece, full facepiece, or mouthpiece respirators equipped with air purifying units to remove gases, vapors and particulate matter from the ambient air prior to its inhalation. Some air purifying respirators are blower-operated and provide respirable air to the facepiece (or hood) under a slight positive pressure.

B-2. General limitations. *a.* Air purfiying respirators do not protect against oxygen-deficient atmospheres nor against skin irritation by or absorption through the skin of airborne contaminants.

b. The maximum contaminant concentration against which an air purifying respirator will protect is determined by the designed efficiency and capacity of the cartridge, canister or filter for the contaminant. The maximum concentration for which the air purifying unit is effective is specified below or by applicable Federal occupational health standards. *Respirators do not provide the maximum design protection specified unless the facepiece is carefully fitted to the 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; and the wearer's respiratory rate. The proper type of canister, cartridge or filter must be selected for the particular atmosphere and conditions. Air purifying respirators may cause discomfort and objectionable resistance to breathing. Respirator facepieces present special problems to individuals required to wear prescription lenses.

B-3. Gas and vapor-removing respirators. *a. General description.* Packed sorbent beds (cartridge or canister) remove single gases or vapors (for example, chlorine gas); a single class of gases or vapors (for example, organic vapors); or a combination of two or more classes of gases and vapors (for example, acid gases, organic vapors, ammonia, and carbon monoxide) by adsorption, chemical reaction or catalysis, or a combination of these methods.

b. General limitations. No protection is provided against particulate contaminants, unless specified on canister or cartridge label. A rise in canister or cartridge temperature indicates that a gas or vapor is being removed from the inspired air. This is not a reliable indicator of canister performance. An uncomfortably high temperature indicates a high concentration of gas or vapor, and requires an immediate return to fresh air.

c. Gas masks.

(1) *Description.* Includes all completely assembled air purifying masks which are designed for use as respiratory protection during entry into atmospheres not immediately dangerous to life or health, or escape only from hazardous atmospheres containing adequate oxygen to support life. They are further described according to the types of gases or vapors they are designed to protect against.

(a) Front-mounted and back-mounted. A gas mask which consists of a full facepiece, breathing tube, canister at the front or back, canister harness, and associated connections.

(b) Chin-style gas mask. A gas mask which consists of a full facepiece, canister which is usually attached to the facepiece and associated connections.

(c) Escape gas mask. A gas mask designed for use during escape only from hazardous atmospheres which consists of a mouthpiece, canister and associated connections.

(2) *Limitations.*

(a) Gas masks shall be used only for escape from (not entry into) atmospheres immediately dangerous to life or health, and shall not be used against gases or vapors with poor warning properties or which generate high heats of reaction with sorbent materials in the canister.

(b) In general gas masks have only been tested and approved against the following contaminants or class of contaminants as follows:

Contaminant	Mask type					
	Front or back mounted		Chin style		Escape only	
	Max. conc. (ppm)	Time (min)	Max. conc. (ppm)	Time (min)	Max. conc. (ppm)	Time (min)
Acid gas	20,000	12	5,000	12	5,000	12
Ammonia	30,000	12	5,000	12	5,000	12
Organic vapor	20,000	12	5,000	12	5,000	12
Carbon monoxide	20,000	60	none	—	10,000	60
Conbination of all above	Same as above except time for acid gas, organic vapor and ammonia is 6 minutes.					

(c) Eye protection may be required when escape type gas masks are used.

d. Chemical cartridge respirators.

(1) *Description.* Includes all completely assembled respirators which are designed for use as respiratory protection during entry into or escape from atmospheres not immediately dangerous to life and health, and are described according to the specific gases or vapors against which they are designed to provide respiratory protection. Each device may contain the following component parts, as appropriate: Facepiece (half-mask or full), mouthpiece, hood, or helmet; cartridge; cartridge with filter; harness; breathing tube; attached blower.

(2) *Limitations.*

(a) Chemical cartridge respirators shall not be used in atmospheres immediately dangerous to life or health, and will be limited to the maximum concentration of gases and vapors specified below or as specified on the cartridge (also see specific standard for control of exposure to chemical(s) in question):

Type of chemical cartridge respirator	*Maximum use concentration (ppm)*
Ammonia	300
Chlorine	10
Hydrogen chloride	50
Methyl amine	100
Organic vapor *	1,000
Sulfur dioxide	50
Vinyl chloride	10

*Not for use against organic vapors with poor warning properties or those which generate high heats of reaction with sorbent material in the cartridge. Maximum use concentrations are lower for organic vapors which produce atmospheres immediately dangerous to life or health at concentrations equal to or lower than this concentration.

(b) Half-Mask facepiece. No protection is provided for the eyes. Fabric coverings of the facepiece shall not be used since they will permit gases and vapors to leak into the mask.

(c) Mouthpiece respirator. Mouth breathing prevents detection of contaminants by odor. The nose clip shall be securely in place to prevent nasal breathing. No protection is provided to the eyes.

B-4. Dust, fume, and mist respirators. *a. Description.* Includes all completely assembled respirators designed for use as respiratory protection during entry into and escape from hazardous particulate atmospheres which contain adequate oxygen to support life. Devices may be attached to a powered blower. Each device may contain the following component parts as required: Facepiece (half-mask or full), mouthpiece with nose clip, hood or helmet; filter unit; harness; attached blower; and breathing tube. These devices are further described as follows:

(1) Respirators, either with replaceable or reusable filters, designed as respiratory protection against dusts, fumes, and mists having maximum acceptable exposure limits not less than 0.05 milligram per cubic meter (mg/m^3) of air.

(2) Respirators, with replaceable filters, designed as respiratory protection against dust, fumes, and mists having maximum acceptable exposure limits less than 0.05 mg/m^3 (high efficiency filter).

(3) Respirators, with replaceable filters, designed as respiratory protection against radon daughters, and radon daughters attached to dusts, fumes and mists (high efficiency filter).

(4) Respirators, with replaceable filters, designed as respiratory protection against asbestos containing dusts and mists.

(5) Single-use dust respirators designed as respiratory protection against pneumoconiosis and

fibrous producing dusts, or dusts and mists, including asbestos.

b. Limitations.

(1) *General.* Protect against nonvolatile particles only. No protection against gases and vapors. The filter shall be replaced or cleaned when breathing becomes difficult due to plugging by retained particles. These respirators shall not be used during shot and sand blasting operations.

(2) *Half-Mask facepieces.* Fabric coverings are only permissible in atmospheres of coarse dusts and mists of low toxicity. No protection is provided to the eyes.

(3) *Mouthpiece respirator.* Nose clip shall be firmly in place to prevent nasal breathing. Mouth breathing prevents the detection of any incidental vapor contaminants by odor. No protection is provided to the eyes.

B-5. Combination gas, vapor, and particulate removing respirators.

a. Description. Includes all the devices discussed having either canisters or cartridges with filters for protection against dusts, mists, fumes, gases and vapors. These include respirators which have been tested against lacquer and enamel mists (paint spray respirators).

b. Limitations. With the exception that these devices protect against both gases and vapors and particulates, the limitations of the other devices would also apply to the combination device.

B-6. Pesticide respirators. *a. Description.* Completely assembled respirators designed for use as respiratory protection during entry into and escape from atmospheres containing hazardous levels of pesticides. These include the following types:

(1) Front- or back-mounted gas masks.

(2) Chin style gas masks.

(3) Chemical cartridge respirator.

(4) Air purifying respirator with attached blower.

(5) Combination devices.

b. Limitations. Limitations previously discussed for each type of device will also apply, in general, to pesticide respirators.

c. Fumigation. Fumigant use in enclosed areas, indoor areas, or where poor ventilation is present should be closely controlled. Only gas masks,* air line or self-contained breathing apparatus (SCBA) should be used. Only canisters specifically designed for the particular fumigant exposure should be used. Canisters should be used only once because of the poor warning properties of many fumigants.

Fumigant	*Suggested respiratory protection*
Aluminum phosphide	Canister specifically for phosphine; SCBA; air line
Hydrocyanic acid (hydrogen cyanide)	Canister specifically for hydrogen cyanide; SCBA; air line
Methyl bromide	Canister specifically for methyl bromide; SCBA; air line
Methylene chloride	SCBA or air line only

*** Gas masks are designed solely to remove specific contaminants from the air. It is essential that their use be restricted to atmospheres which contain sufficient oxygen to support life (at least 19.5 percent by volume) and which contain generally no more than 2 percent concentrations of toxic gases and vapors by volume. If the specific exposure concentrations are suspected of exceeding the specific limitations, only a self-contained breathing apparatus or air line respirator should be used.**

Section II. ATMOSPHERE SUPPLYING RESPIRATORS

B-7. General description. A respirable atmosphere is supplies independent of the ambient air surrounding the wearer. These devices provide protection against oxygen deficiency and most toxic atmospheres.

B-8. General limitations. Except for the supplied-air suit, no protection is provided against skin irritation by materials such as ammonia and hydrochloric acid (HCl), or against absorption of materials such as hydrocyanic acid (HCN), tritium, or organic phosphate pesticides through the skin. Facepieces present special problems to individuals required to wear prescription lenses.

B-9. Self-contained breathing apparatus. *a. Description.* Includes all completely assembled, portable, self-contained devices designed for use as respiratory protection during entry into and escape from, or escape only from, hazardous atmospheres.

(1) *Closed-circuit apparatus.* An apparatus of the type in which the exhaled air is rebreathed by the wearer after the carbon dioxide has been effectively removed and a suitable oxygen concentration restored from sources composed of compressed, chemical, or liquid oxygen.

(2) *Open-circuit apparatus.* An apparatus of the following types from which exhaled air is vented to the atmosphere and not rebreathed:

(a) Demand type apparatus. An apparatus in which the pressure inside the facepiece in relation to the immediate environment is positive during exhalation and negative during inhalation.

(b) Pressure-demand type apparatus. An apparatus in which the pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.

b. Limitations.

(1) *General.* Use is permissible in atmospheres immediately dangerous to life or health. The period over which the device will provide protection is limited by the amount of air oxygen in the apparatus, the ambient atmospheric pressure (service life is cut in half by a doubling of the atmospheric pressure), and workload. A warning device shall be provided to indicate to the wearer when the service life has been reduced to a low level. Some SCBA devices have a short service life (few 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.

(2) *Closed-circuit apparatus.* The closed-circuit operation conserves oxygen and permits longer service life.

(3) *Open-circuit demand and pressure demand.* The demand type produces a negative pressure in the facepiece on inhalation whereas the pressure-demand type maintains a positive pressure in the facepiece and is less apt to permit inward leakage of contaminants.

B-10. Supplied-air respirators. *a. Description.* Includes all completely assembled respirators designed for use during entry into or escape from hazardous atmospheres. The respirable air supply is not limited to the quantity an individual can carry, thus the devices are lightweight and relatively simple.

(1) *Type "A" supplied air respirator.* A hose mask respirator for entry into and escape from atmospheres not immediately dangerous to life or health. It consists of a motor-driven or hand-operated blower that permits the free entrance of air when the blower is not operating, a strong large-diameter hose having a low resistance to airflow, a harness to which the hose and the lifeline are attached, and a tight fitting facepiece. (This respirator shall not be used in oxygen deficient atmospheres.)

(2) *Type "B" supplied-air respirator.* A hose mask respirator for entry into and escape from atmospheres not immediately dangerous to life or health. It consists of a strong, large-diameter hose with low resistance to airflow through which the user draws inspired air by means of his lungs alone, a harness to which the hose is attached, and a tight fitting facepiece.

(3) *Type "C" supplied-air respirator.* An air line respirator for entry into and escape from atmospheres not immediately dangerous to life or health. It consists of a source of respirable breathing air; a hose; a detachable coupling; a control valve; orifice; demand valve or pressure-demand valve; an arrangement for attaching the hose to the wearer; and a facepiece, hood or helmet.

(4) *Types "AE," "BE," and "CE" supplied-air respirators.* Types "A," "B," or "C" supplied air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion; and with shielding material to protect the window(s) of facepieces, hoods, and helmets that do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

b. Limitations.

(1) *General.* The wearer is restricted in movement by the hose or air line, and must return to a respirable atmosphere by retracing his route of entry. The hose or air line is subject to being severed or pinched-off.

(2) *Type "A" hose mask respirator with blower.* If the blower fails, the unit still provides an air supply and sufficient protection to permit the wearer to escape although a negative pressure exists in the facepiece during inhalation. Use is not permissible in atmospheres immediately dangerous to life or health including oxygen deficient atmospheres.

(3) *Type "B" hose mask without blower.* If the air supply fails, no protection is provided the wearer. Limited to use in atmospheres not immediately dangerous to life or health and from which the wearer can escape unharmed without aid of the respirator.

(4) *Type "C" air line respirators* (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 facepiece at all times and are less apt to permit inward leakage of contaminants. Demand flow and pressure-demand air line respirators may be used in atmospheres immediately dangerous to life or health provided an auxiliary self-contained air supply is worn to permit escape if the air supply fails.

Section III. TABLES FOR GENERAL INFORMATION

Table 1. Guide for Selection of Respirators

Hazard	*Respirator**
Oxygen deficiency.	Self-contained breathing apparatus. Combination air-line (Type C) with auxiliary self-contained air supply or an air-storage receiver with alarm.
Gas and vapor contaminants immediately dangerous to life or health.	Self-contained breathing apparatus. Air-purifying, full facepiece respirator with chemical canister (gas mask-for escape only).** Self-rescue mouthpiece respirator (for escape only).** Combination air-line respirator (Type C) with auxiliary self-contained air supply or an air-storage receiver with alarm.
Not immediately dangerous to life or health.	Air-line respirator (Type C). Hose mask with blower (Type A). Hose mask without blower (Type B). Air-purifying, gas-mask or chemical cartridge respirator with appropriate canister or cartridge.**
Particulate contaminants immediately dangerous to life or health.	Self-contained breathing apparatus. Air-purifying, full facepiece respirator (gas mask) with appropriate filter (for escape only).** Self-rescue mouthpiece respirator (for escape only).** Combination air line respirator (Type C) with auxiliary self-contained air supply or air-storage receiver with alarm.
Not immediately dangerous to life or health.	Air purifying, half-mask or mouthpiece respirator with filter pad or cartridge. Air line respirator (Type C). Air line abrasive-blasting respirator (Type CE). Hose mask with blower (Type A). Hose mask without blower (Type B or BE).
Combination gas, vapor and particulate contaminants immediately dangerous to life or health.	Self-contained breathing apparatus. Air purifying, full facepiece respirator with chemical canister and appropriate filter (gas mask with filter).** Self-rescue mouthpiece respirator (for escape only). Combination air line respirator (Type C or CE) with auxiliary self-contained air supply or an air-storage receiver with alarm.
Not immediately dangerous to life or health.	Air line respirator. Hose mask with blower (Type A). Hose mask without blower (Type B or BE). Air purifying, gas mask or chemical cartridge respirator with appropriate filter.**

* Refer to section I, appendix B, for a more complete description of respirator.

** Not for use against gases or vapors with poor warning properties or which generate high heats of reaction with sorbent materials in canister or cartridge.

Table 2 Respiratory Protective Devices Approved by the National Institute for Occupational Safety and Health

PART I
DUST, FUME, AND MIST RESPIRATORS

Respirator	Approval No.	Protection afforded in addition to dusts					Facepiece type[1]
		Asbestos	Mist	Fumes	Radio-nuclides	Radon daughters	
[2] 3M-8710 (single use)	TC-21C-132	x	—	—	—	—	ON
[2] MSA 459440 with 459595(10) or 459693(100) filters	TC-21C-133	x	x	—	—	—	ON
[2] MSA 459438 with 459594 filters and 461011	TC-21C-134	x	x	x	—	—	ON
[3] MSA 459439 with 459593 filters and 461010	TC-21C-135	—	x	x	x	—	ON
[3] 3M W250, W252, W254, W255, W260, W261, W266, W267, W268 (powered air purifying respirator)	TX-21C-136A	—	x	x	x	x	HH
[2] 3M W251 and W265 (powered air purifying respirator for abrasive blasting)	TC-21C-137	—	—	—	—	—	HH
[2] MSA 96000 and 457344	TC-21C-138	—	x	—	—	—	ON
[2] Willson 560	TC-21C-139	—	x	—	—	—	ON
[2] Willson 1210	TC-21C-140	x	x	—	—	—	ON
[2] Willson 1211	TC-21C-141	x	x	x	—	—	ON
[3] Willson 1212	TC-21C-142	—	x	x	x	—	ON
[2] Willson 1400 (single use)	TC-21C-143	x	—	—	—	—	ON
[2] A.O. R5030	TC-21C-144	x	x	—	—	—	ON
[2] A.O. R6030	TC-21C-145	x	x	—	—	—	ON
[2] A.O. R1050 (single use)	TC-21C-147	x	—	—	—	—	ON
[3] Scott 662-1 and 662-2 (with 502-R filter)	TC-21C-149	—	x	x	x	—	FF
[3] MSA 88479 and 457117 (with 88480 filter)	TC-21C-150	—	x	x	x	—	FF
[2] Norton 7506 and 7506M (with 7500-6 filters)	TC-21C-151	x	x	—	—	—	ON
[3] Norton 7580 and 7580M (with 7500-8 filters)	TC-21C-152	—	x	x	x	—	ON
[2] Norton 7406L and 7406LM with 7400-6 filters	TC-21C-153	x	x	—	—	—	ON
[2] Sellstrom 315-F100	TC-21C-154	x	—	—	—	—	ON
[2] Cover 1482-F100	TC-21C-154	x	—	—	—	—	ON
[2] Safe-tex 236-F100	TC-21C-154	x	—	—	—	—	ON
[2] Eastern E-450	TC-21C-154	x	—	—	—	—	ON
[3] MSA 460185 (with 459322 filter)	TC-21C-155	—	x	x	x	—	FF
[2] MSA 461683 (with 457481 filter)	TC-21C-156	—	x	—	—	—	ON
[2] Pulmosan C264 (with C264-7 filter)	TC-21C-157	—	x	—	—	—	ON
[3] Pulmosan C263 (with C263-7 filter)	TC-21C-158	—	x	x	x	—	ON
[2] MSA 460357 (with 45781 filter)	TC-21C-159	—	x	—	—	—	ON
[3] A.O. R5057 and R6057 (with R57 filter)	TC-21C-160	—	x	x	x	—	ON
[2] A.O. R5056 and R6056 (with R56 filter)	TC-21C-161	x	x	x	—	—	ON
[2] A.O. R8100 (with R100 filter)	TC-21C-162	—	x	—	—	—	ON

See footnotes at end of table.

Respirator	Approval No.	Protection afforded in addition to dusts					Facepiece type[1]
		Asbestos	Mist	Fumes	Radio-nuclides	Radon daughters	
[2] Cesco 94R20 (with R20 filter)	TC-21C-163	x	x	—	—	—	ON
2 Glendale GR2000 and GR4000 (with F-10 fil ters)	TC-21C-164	—	x	—	—	—	ON
[2] Pulmosan L800 (with C264-7 filter)	TC-21C-165	—	x	—	—	—	ON
[2] A.O. R209ON (with R9ON filter)	TC-21C-166	—	x	—	—	—	ON
[2] DeVilbiss MSD-507 (with MSD-508 filter)	TC-21C-167	—	x	—	—	—	ON
[3] Norton 75BP80 (with 7500-8 filter)	TC-21C-168	—	x	x	x	—	ON
[2] A.O. R8156 (with R156 filter)	TC-21C-169	—	x	x	—	—	ON
[2] [4] Norton 7170 (reusable)	TC-21C-170	—	—	—	—	—	ON
[2] [4] Norton 7170 (single use)	TC-21C-170A	x	—	—	—	—	ON
[3] Norton 7680 and 768ON (with 7500-8 filters)	TC-21C-171	—	x	x	x	—	FF
[2] Glendale GR1000 and GR3000 (with F-10A fil ter)	TC-21C-172	—	x	—	—	—	ON
[2] 3M 8800 (single use)	TC-21C-173	—	—	—	—	—	ON
[2] Binks 40-150	TC-21C-174	—	—	—	—	—	ON
[2] Norton 7100 and 7100V	TC-21C-175	—	x	—	—	—	ON
[2] 3M9900	TC-21C-176	x	—	—	—	—	ON
[2] Scott 604035-00 6411-2100 6411-3100 6413-2100 6413-3100	TC-21C-177	—	x	—	—	—	ON
[3] Scott 604022-50 6411-2050 6411-3050 6413-2050 6413-3050	TC-21C-178	—	x	x	x	x	ON
[2] US Safety 150T10	TC-21C-179	x	x	—	—	—	ON
[2] Cesco 95RC15	TC-21C-180	x	x	—	—	—	ON
[2] MSA 462240	TC-21C-181	—	x	—	—	—	ON
[2] Willson 1610 and 1710	TC-21C-182	x	x	—	—	—	FF
[2] Willson 1611 and 1711	TC-21C-183	x	x	x	—	—	FF
[4] Willson 1612 and 1712	TC-21C-184	—	x	x	x	—	FF
[4] MSA 463353, 463354, 463355	TC-21C-186	—	x	x	x	—	ON, FF
[2] MSA 461847	TC-21C-187	x	x	x	—	x	FF
[2] MSA 461845	TC-21C-188	x	x	—	—	—	FF
[2] Glendale GR-2026	TC-21C-189	—	x	x	—	—	ON
[2] 3M 9910	TC-21C-190	x	x	—	—	—	ON
[2] Norton 7606, 7606S, 7606N, 7606SN	TC-21C-191	x	x	—	—	—	FF
[2] US Safety 150T11	TC-21C-193	x	x	x	—	x	ON
[2] Cesco 95RC16	TC-21C-194	x	x	x	—	x	ON

See footnotes at end of table.

Respirator	Approval No.	Protection afforded in addition to dusts					Facepiece type[1]
		Asbestos	Mist	Fumes	Radio-nuclides	Radon daughters	
Glendale SU-1 (single use)	TC-21C-195	x	—	—	—	—	ON
Cover 1482-F108	TC-21C-196	x	x	x	—	x	ON
[2] Racal AH-5 (powered air)	TC-21C-197	x	x	—	—	—	FF
[2] Scott 6422-0100	TC-21C-198	x	x	—	—	—	FF
[3] Scott 6422-0050	TC-21C-199	—	x	x	x	x	FF
[3] MSA 466095, 466096 (combination type C, continuous flow 35-40 psig, 35-300-foot hose)	TC-21C-200	—	x	x	—	—	FF
[3] MSA 466097, 466098 (combination type C, continuous flow 35-40 psig, 25-300-foot hose)	TC-21C-201	—	x	x	—	—	ON
[2] 3M 9920	TC-21C-202	x	x	x	—	x	ON
[2] Norton 7507, 7507M	TC-21C-203	—	x	x	—	—	ON
[2] Norton 75BP07, 75BP07M	TC-21C-204	—	x	x	—	—	ON
[2] Norton 7607, 7607S	TC-21C-205	—	x	x	—	—	FF
[2] MSA 467010	TC-21C-206	x	x	—	—	—	ON
[2] AO R7030	TC-21C-207	x	x	—	—	—	FF
[3] AO R7057	TC-21C-208	—	x	x	—	—	FF
[2] Scott 6411-0300, 6413-0300, 6423-0300	TC-21C-209	x	x	x	—	x	ON
[2] Scott 6470-0300	TC-21C-210	x	x	x	—	x	FF
[2] Racal AH 15 (powered air), AH 21	TC-21C-211	x	x	—	—	—	HH
[3] Racal AH 3 (powered air), AH 17	TC-21C-212	—	x	x	x	x	HH
[2] MSA 467559	TC-21C-213	x	x	—	—	—	ON
[2] Willson 1410	TC-21C-214	—	x	—	—	—	ON
[2] Binks 40-145	TC-21C-215	—	x	—	—	—	ON
[2] Cesco 96 RC 15	TC-21C-216	x	x	—	—	—	FF
[2] US Safety 151T10	TC-21C-217	x	x	—	—	—	FF
[2] Cesco 96RC16	TC-21C-218	x	x	—	—	x	FF
[2] US Safety 151T11	TC-21C-219	x	x	—	—	x	FF
[2] MSA 767541	TC-21C-220	x	x	—	—	—	ON

[1] ON—orinasal; FF—full facepiece; HH—hood or helment.
[2] Approved for particulates having a permissible TWA level not less than 0.05 mg/m³ or 2 mp pcf.
[3] Approved for particulates having a permissible TWA level less than 0.05 mg/m³ or 2 mppcf (high efficiency filter).
[4] Data incorrect in NIOSH certified equipment list (DHEW (NIOSH) Publication No. 80-144).

PART II
CHEMICAL CARTRIDGE RESPIRATORS

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
[9] MSA 459433 and 461005	TC-23C-40	x	x	—	—	x	—	—	ON
[9] MSA 459434 and 461006	TC-23C-41	x	x	—	—	x	x[2]	—	ON
[9] MSA 459436 and 461008	TC-23C-43	x	x	—	—	x	x[4]	—	ON
[9] [12] MSA 459435 and 461007	TC-23C-47	x	x	—	—	x	x[2]	—	ON
Norton 7501 and 7501M	TC-23C-49	—	—	—	—	—	—	—	ON
[9] Willson 1221	TC-23C-50	x	x	x	x	x	—	x	ON
[9] Willson 122110	TC-23C-51	x	x	—	—	x	—	—	ON
[9] Willson 122113	TC-23C-52	x	x	x	—	x	—	—	ON
[9] Willson 122115	TC-23C-54	x	x	—	x	—	—	x	ON
Scott 70-CL (escape only)	TC-23C-55	—	—	—	—	—	x[6]	—	M
A.O. R4051 R5051 R6051	TC-23C-56/57	—	—	—	—	—	—	—	ON
DeVilbiss MSE-502 (with MSE-506 cartridges) MSE-502-1	TC-23C-59	—	—	—	—	—	—	—	ON
A.O. R4052 R5052 R6052	TC-23C-60/61	—	—	—	—	—	x[3]	—	ON
Norton 7504 and 7504M (with 7500-4 cart)	TC-23C-63	—	—	—	—	—	x[5]	—	ON
[9] Norton 7514 and 7514M (with 7500-4 cart and 7500-6 filter)	TC-23C-64	x	x	—	—	x	x[5]	—	ON
Norton 7503 and 7503M (with 7500-3 cart)	TC-23C-65	—	—	—	—	—	x[2]	—	ON
[9] Norton 7513 and 7513M (with 7500-3 cart and 7500-6 filter)	TC-23C-66	x	x	—	—	x	x[2]	—	ON
Willson 1224, 1224S, 1224SR	TC-23C-70	—	—	—	—	—	x[4]	—	ON
[9] Willson 122410, 122410S, 122410SR	TC-23C-71	x	x	—	—	x	x[4]	—	ON
[9] Norton 7511 and 7511M (with 7500-1 cartridge and 7500-6 filters)	TC-23C-73	x	x	x	—	x	—	—	ON
Norton 7549 and 7549M (with 7500-21 cartridge and 7500-23 filter)	TC-23C-74	—	—	—	—	—	—	x	ON

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
Norton 7531 and 7531M (with 7500-1 cartridges and 7500-10 filters)	TC-23C-75	—	—	—	x	—	—	—	ON
Acme Automotive Finishes 27	TC-23C-75	—	—	—	x	—	—	—	ON
Willson 1225, 1225S, 1225SR	TC-23C-76	—	—	—	—	—	x[2]	—	ON
• Willson 122510, 122510S, 122510SR	TC-23C-77	x	x	—	—	x	x[2]	—	ON
3M W-262-12, -24 W263-L, -M, -S W-279-12, -24 W-264 W-291-12, -24 W-296-12, -24	TC-23C-78 (powered air)	—	—	—	—	—	—	x	HH
MSA 448848 (with 448847 cartridges) and 461009	TC-23C-79	—	—	—	—	—	—	x	ON
• MSA 448849, 462241 460853, 466249 466250, 466251 466255, 466528 466529	TC-23C-80	x	x	—	x	—	—	—	ON
Pulmosan C256, 10009 10183, 10219	TC-23C-81	—	—	—	—	—	—	—	ON
A.O. R4053, R5053 and R6053 (with R53 cartridges)	TC-23C-82	—	—	—	—	—	x[2]	—	ON
• A.O. R4055, R5055 and R6055 (with R55 cartridges)	TC-23C-83	x	x	—	—	—	—	—	ON
A.O. R8151 (with R151 cartridges)	TC-23C-84	—	—	—	—	—	—	—	ON
A.O. R8153 (with R153 cartridge)	TC-23C-85	—	—	—	—	—	x[2]	—	ON
Binks 40-129 (with 40-130 cartridge)	TC-23C-86	—	—	—	—	—	—	—	ON
• Binks 40-128 (with 40-130 cartridges and 40-131 filters)	TC-23C-87	x	x	—	x	—	—	—	ON
Glendale GR 2021 and GR 4021 (with C21 csrtridges)	TC-23C-88	—	—	—	—	—	—	—	ON
• Glendale GR 2021-10 GR 4021-10 (with C21 cartridges F10 fillers)	TC-23C-89	x	x	—	—	—	—	—	ON
Glendale GR 2021-20 GR 4021-20	TC-23C-90	—	—	—	x	—	—	—	ON

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
GR 4021-60									
GR 2021-60									
° Pulmosan C59	TC-23C-91	x	x	—	—	—	—	—	ON
10024									
10198									
10222									
° A.O. R8191P (with R191 cartridges)	TC-23C-92	x	x	—	x	—	—	—	ON
° A.O. R8151P (with R151 cartridges and R149 filters)	TC-23C-93	x	x	—	x	—	—	—	ON
° A.O. R4051	TC-23C-94/95	x	x	—	x	—	—	—	ON
R5051									
R6061									
° DeVilbiss MSP-505	TC-23C-96	x	x	—	x	—	—	—	ON
MSP-505-1									
° A.O. R4091P	TC-23C-97/98	x	x	—	x	—	—	—	ON
A.O. R5091P									
R6091P									
Cesco 94R40 (with R40 cartridge)	TC-23C-99	—	—	—	—	—	—	—	ON
Pulmosan C251	TC-23-100	—	—	—	x	—	—	—	ON
Fiber Metal C251	TC-23-100	—	—	—	x	—	—	—	ON
10006									
10180									
10225									
Norton 7401L (with 7400-1L cartridge 7401LM	TC-23C-101	—	—	—	—	—	—	—	ON
Norton 75BP01 (with 7500-1 cartridge) 75BP01M	TC-23C-102	—	—	—	—	—	—	—	ON
° Norton 75BP11 (with 7500-1 cartridges and 7500-6 filters) 75BP11M	TC-23C-103	x	x	—	—	x	—	—	ON
Norton 75BP03 (with 7500-3 cartridges) 75BP03M	TC-23C-104	—	—	—	—	—	x[2]	—	ON
° Norton 75BP13 (with 7500-3 cartridges and 7500-6 filters) 75BP13M	TC-23C-105	x	x	—	—	x	x[2]	—	ON
A.O. R4058	TC-23C-106	x	x	x	—	—	—	x	ON
R5058									
R6058									
Cover 1482-G100 (with G100 cartridges)	TC-23C-107	—	—	—	—	—	—	—	ON
Sellstrom 315-G100	TC-23C-107	—	—	—	—	—	—	—	ON
Eastern Safety E451	TC-23C-107	—	—	—	—	—	—	—	ON

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
Safe-Tex 236-G100	TC-23C-107	—	—	—	—	—	—	—	ON
MSA 460400 (with 460401 cartridges) (pocket book style) (escape only)	TC-23C-108	—	—	—	—	—	x[4]	—	M
A.O. R4054 R5054 R6054	TC-23C-109	—	—	—	—	—	x[4]	—	ON
Pulmosan C241	TC-23C-110	—	—	—	—	—	—	x	ON
Fiber Metal C241 10003 10177 10228	TC-23C-110	—	—	—	—	—	—	x	ON
[9] [12] A.O. R9722 (Escape only)	TC-23C-111	x	x	—	—	—	x[3]	—	M
Scott 604022-13, 6040-13 6411-2013, 6411-0013 6411-3013, 6413-0013 6413-2013, 6413-3013 6421-0013, 6423-0013	TC-23C-113	—	—	—	—	—	—	—	ON
[9] Scott 604032-13, 6411-2113 6411-0113, 6411-3113 6413-0113, 6413-2113 6421-0113, 6413-3113 6423-6113	TC-23C-114	x	x	—	—	—	—	—	ON
Scott 604022-01, 6413-2001 6411-0001, 6413-3001 6413-0001, 6411-2001 6421-0001, 6411-3001 6423-0001	TC-23C-115	—	—	—	—	—	x[3]	—	ON
[9] Scott 604032-01, 6411-2101 6411-0101, 6411-3101 6413-0101, 6413-2101 6421-0101, 6413-3101 6423-0101	TC-23C-116	x	x	—	—	—	x[3]	—	ON
Scott 604032-00, 6411-2213 6411-0213, 6411-3213 6413-0213, 6413-2213 6421-0213, 6413-3213 6423-0213	TC-23C-17	—	—	—	x	—	—	—	ON
US Safety 150T20	TC-23C-118	—	—	—	—	—	—	—	ON
Cesco 95RC25	TC-23C-119	—	—	—	—	—	—	—	ON

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
[9] US Safety 158T23	TC-23C-120	x	x	—	—	x	—	—	ON
[9] Cesco 95RC45	TC-23C-121	x	x	—	—	x	—	—	ON
[9] Norton 7542 and 7542M	TC-23C-122	x	x	—	—	x	x[3]	—	ON
[9] 3M 8712 and 8732 (single use)	TC-23C-123	x dust &mist (8732 filter only)	x	—	x	—	—	—	ON
Cover 1482-G100-F102	TC-23C-124	—	—	—	x	—	—	—	ON
Eastern E454	TC-23C-124	—	—	—	x	—	—	—	ON
Sellstrom 315-G100-F102	TC-23C-124	—	—	—	x	—	—	—	ON
Safe-Tex 236G100-F102	TC-23C-124	—	—	—	x	—	—	—	ON
US Safety 150T24	TC-23C-125	—	—	—	x	—	—	—	ON
Cesco 95RC35	TC-23C-126	—	—	—	x	—	—	—	ON
Stewart-Warner 7931	TC-23C-127	—	—	—	x	—	—	—	ON
Northcott 70-450	TC-23C-128	—	—	—	x	—	—	—	ON
3M 8714 and 8720 (single use)	TC-23C-129	— dust & mist (8720 only)	x	—	—	—	x[3]	—	ON
Willson 1621 and 1721	TC-23C-130	—	—	—	—	—	—	—	FF
[9] Willson 162133 and 172113	TC-23C-131	—	x	x	—	—	—	—	FF
[9] Willson 162115 and 172115	TC-23C-133	x	x	—	x	—	—	x	FF
[9] Willson 162110 and 172110	TC-23C-134	x	x	—	—	x	—	—	FF
Willson 1624 and 1724	TC-23C-139	—	—	—	—	—	x[4]	—	FF
[9] Willson 162410 and 172410	TC-23C-140	x	x	—	—	x	x[4]	—	FF
Willson 1625 and 1725	TC-23C-141	—	—	—	—	—	x[2]	—	FF
[9] Willson 162510 and 172510	TC-23C-142	x	x	—	—	x	x[2]	—	FF
[9] MSA 461848	TC-23C-144	x	x	—	—	x	—	—	FF
[9] MSA 461849	TC-23C-149	x	x	—	—	x	x[3]	—	FF
[9] MSA 461850	TC-23C-146	x	x	—	—	x	x[2]	—	FF
[9] MSA 461851	TC-23C-147	x	x	—	—	x	x[4]	—	FF
MSA 461858	TC-23C-148	—	—	—	—	—	—	x	FF
MSA 461846, 466256, 466257	TC-23C-149	x	x	—	x	—	—	—	FF
[10] MSA 461854	TC-23C-150	x	x	x	—	—	x[3]	—	FF
[9] MSA 461852	TC-23C-151	x	x	x	—	x	—	—	FF
[10] MSA 461857	TC-23C-152	x	x	x	—	—	x[4]	—	FF
[10] MMSA 461855	TC-23C-153	x	x	x	—	—	x[2]	—	FF
[11] MSA 461856	TC-23C-154	x	x	x	—	x	x[2]	—	FF

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
[10] MSA 461853	TC-231-155	x	x	x	—	—	—	—	FF
[10] MSA 461835 and 462239	TC-23C-156	x	x	x	—	—	x[3]	—	ON
[9] MSA 460965 and 462238	TC-23C-157	x	x	—	—	x	—	—	ON
[10] MSA 460849 and 461015	TC-23C-158	x	x	x	—	—	x[4]	—	ON
[10] MSA 460847 and 461013	TC-23C-159	x	x	x	—	—	x[2]	—	ON
[11] MSA 460848 and 461014	TC-23C-160	x	x	x	—	x	x[4]	—	ON
[10] MSA 460846 and 461012	TC-23C-161	x	x	x	—	—	—	—	ON
Cover 1482-G104	TC-23C-163	x[13]	x[13]	—	—	x[13]	x[2]	—	ON
1482-G104-F100									
[9] [12] Sellstrom 315-G-104-F100	TC-23C-163	x	x	—	—	x	x[2]	—	ON
[10] Eastern E-452	TC-23C-163	x	x	—	—	x	x[2]	—	ON
Cesco 95RC55	TC-23C-164	—	—	—	—	—	x[3]	—	ON
[9] Cesco 95RC75	TC-23C-165	x	x	—	—	x	x[3]	—	ON
Cesco 95RC85	TC-23C-166	—	—	—	—	—	x[2]	—	ON
[9] Cesco 95RC105	TC-23C-167	x	x	—	—	x	x[2]	—	ON
US Safety 150T21	TC-23C-168	—	—	—	—	—	x[3]	—	ON
[9] US Safety 150T25	TC-23C-169	x	x	—	—	x	x[3]	—	ON
US Safety 150T26	TC-23C-170	—	—	—	—	—	x[2]	—	ON
[9] US Safety 150T28	TC-23C-171	x	x	—	—	x	x[2]	—	ON
Scott 604022-15, 6411-2015	TC-23C-172	—	—	—	—	—	x[2]	—	ON
6411-0015, 6411-3015									
6413-0015, 6413-2015									
6421-0015, 6413-3015									
6423-0015									
[10] Scott 604032-15, 6411-2115	TC-23C-174	x	x	—	—	x	x[2]	—	ON
6411-0115, 6411-3115									
6413-0115, 6413-2115									
6421-0115, 6413-3115									
6423-0115									
Norton 75BP31 and 75BP31M	TC-23C-175	—	—	—	x	—	—	—	ON
Norton 75BP04 and 75BP04M	TC-23C-176	—	—	—	—	—	x[5]	—	ON
[9] Norton 75BP14 and 75BP14M	TC-23C-177	x	x	—	—	x	x[5]	—	ON
Norton 75BP49 and 75BP49M	TC-23C-178	—	—	—	—	—	—	x	ON
[9] Norton 75BP42 and 75BP42M	TC-23C-179	x	x	—	—	x	x[3]	—	ON
Norton 7601, 7601S, 7601N, 7601SN	TC-23C-180	—	—	—	—	—	—	—	FF
Norton 7603, 7603S, 7603N, 7603SN	TC-23C-181	—	—	—	—	—	x[2]	—	FF
Norton 7604, 7604S, 7604N, 7604SN	TC-230-182	—	—	—	—	—	x[5]	—	FF
Glendale GR-2022 and GR-4022	TC-23C-183	—	—	—	—	—	x[3]	—	ON
[9] Glendale GR-2022-10 and GR-4022-10	TC-23C-184	x	x	—	—	—	x[3]	—	ON

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
[9] Norton 7611, 7611S, 7611N, 7611SN	TC-23C-185	x	x	—	—	x	—	—	FF
[9] Norton 7613, 7613S, 7613N, 7613SN	TC-23C-186	x	x	—	—	x	x[2]	—	FF
[9] Norton 7614, 7614S, 7614N, 7614SN	TC-23C-187	x	x	—	—	x	x[5]	—	FF
Norton 7631, 7631S, 7631N, 7631SN	TC-23C-188	—	—	—	x	—	—	—	FF
[9] Norton 7642, 7642S, 7642N, 7642SN	TC-23C-189	x	x	—	—	x	x[3]	—	FF
Norton 7649, 7649S, 7649N, 7649SN	TC-23C-190	—	—	—	—	—	—	x	FF
US Safety 150T22	TC-23C-191	—	—	—	—	—	x[4]	—	ON
Cesco 95RC65	TC-23C-192	—	—	—	—	—	x[4]	—	ON
[9] US Safety 150T27	TC-23C-193	x	x	—	—	—	x[4]	—	ON
[9] Cesco 95RC95	TC-23C-194	x	x	—	—	—	x[4]	—	ON
[9] 3M 8721 and 8722 (single use)	TC-23C-195	x	x	—	—	—	x[7]	—	ON
[9] 3M 8723 and 8724 (single use)	TC-23C-196	x	x	—	—	—	x[6]	—	ON
Glendale GR-2025 GR-4025	TC-23C-197	—	—	—	—	—	—	x	ON
US Safety 150T30	TC-23C-198	—	—	—	—	—	—	x	ON
Cesco 95RC125	TC-23C-199	—	—	—	—	—	—	x	ON
3M 8716 (single use)	TC-23C-200	—	—	—	—	—	x[8]	—	ON
[9] MSA 465986, 466239, 466240, 466241, 466526, 466527	TC-23C-201	x	x	—	x	—	—	—	ON
[9] Cover 1482-G100 F104	TC-23C-202	x	x	—	—	—	—	x	ON
Pulmosan 10012, 10186, 10240	TC-23C-203	—	—	—	—	—	x[3]	—	ON
[10] [12] Norton 7581, 7581M	TC-23C-204	x	x	x	—	—	—	—	ON
[10] [12] Norton 75BP81, 75BP81M	TC-23C-205	x	x	x	—	—	—	—	ON
[10] [12] Norton 7681, 7681S	TC-23C-206	x	x	x	—	—	—	—	FF
[11] [12] Norton 7582, 7582M	TC-23C-207	x	x	x	—	—	x[3]	—	ON
[11] [12] Norton 75BP82, 75BP82M	TC-23C-208	x	x	x	—	—	x[3]	—	ON
[11] [12] Norton 7682, 7682S	TC-23C-209	x	x	x	—	—	x[3]	—	FF
[11] [12] Norton 7583, 7583M	TC-23C-210	x	x	x	—	—	x[2]	—	ON
[11] [12] Norton 75BP83, 75BP83M	TC-23C-211	x	x	x	—	—	x[2]	—	ON
[11] [12] Norton 7683, 7683S	TC-23C-212	x	x	x	—	—	x[2]	—	FF
[11] [12] Norton 7584, 7584M	TC-23C-213	x	x	x	—	—	x[5]	—	ON
[11] [12] Norton 75BP84, 75BP84M	TC-23C-214	x	x	x	—	—	x[5]	—	ON
[11] [12] Norton 7684, 7684S	TC-23C-215	x	x	x	—	—	x[5]	—	FF
[9] 3M 8725(single use), 8726	TC-23C-216	x[14]	x[14]	—	—	—	x[2]	—	ON
[9] 3M 8727 (single use), 8728	TC-23C-217	x[15]	x[15]	—	—	—	x[4]	—	ON
[9] Scott 6422-0101 6470-0101	TC-23C-218	x	x	—	—	—	x[3]	—	FF
Scott 6422-0013 6470-0013	TC-23C-219	—	—	—	—	—	—	—	FF

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
[9] Scott 6422-0113 6470-0113	TC-23C-220	x	x	—	—	—	—	—	FF
Scott 6422-0015 6470-0015	TC-23C-221	—	—	—	—	—	x[2]	—	FF
[9] Scott 6422-0115 6470-0115	TC-23C-222	x	x	—	—	x	x[2]	—	FF
Scott 6411-2213 6411-3213 6413-2213 6413-3213 6040-3200 6411-0213 6413-0213 6421-0213 6423-0213	[16] TC-23C-223								
[11] [12] Scott 6422-0213 6470-0213	TC-23C-224	x	x	x	—	x	—	x	FF
Scott 6422-0001 6470-0001	TC-23C-225	—	—	—	—	—	x[3]	—	FF
Norton 7502	TC-23C-226		—	—	—	—	x[5]	—	ON
7502M 75BP02M			—	—	—	—	x[3]	—	ON
Norton 7602 7602S 7602N 7602SN	TC-23C-228	—	—	—	—	—	x[3]	—	FF
[9] Norton 7512 7512M	TC-23C-229	x	x	—	—	x	x[3]	—	ON
[9] Norton 75BP12 75BP12M	TC-23C-230	x	x	—	—	x	x[3]	—	ON
[9] Norton 7612 7612S 7612N 7612SN	TC-23C-231	x	x	—	—	x	x[3]	—	FF
[9] Pulmosan 10027	TC-23C-232	x	x	—	—	—	x[3]	—	ON
AO R7052	TC-23C-233	—	—	—	—	—	x[3]	—	FF
AO R7053	TC-23C-234	—	—	—	—	—	x[2]	—	FF

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
AO R7054	TC-23C-235	—	—	—	—	—	x[4]	—	FF
AO R7051	TC-23C-236	—	—	—	—	—	—	—	FF
[9] AO R7055	TC-23C-237	x	x	—	—	—	—	—	FF
[9] AO R7058	TC-23C-238	x	x	x	—	—	—	x	FF
[9] AO R7051P	TC-23C-239	x	x	—	x	—	—	—	FF
[9] AO R7091P	TC-23C-240	x	x	—	x	—	—	—	FF
Glendale GR-2023	TC-23C-241	—	—	—	—	—	x[2]	—	ON
GR-4023									
[9] Glendale GR-2023-10	TC-23C-242	x	x	—	—	—	x[2]	—	ON
GR-4023-10									
[10] MSA 466165	TC-23C-243	x	x	x	—	x	—	—	ON
[10] MSA 466163	TC-23C-244	x	x	x	—	x	—	—	ON
[10] MSA 466164	TC-23C-245	x	x	x	—	x	—	—	FF
[11] Scott 6411-0301	TC-23C-246	x	x	x	—	x	x[3]	—	ON
6421-0301									
6423-0301									
[11] Scott 6470-0301	TC-23C-247	x	x	x	—	x	x[3]	—	FF
[11] Scott 6411-0313	TC-23C-248	x	x	x	—	x	—	—	ON
6413-0313									
6421-0313									
6423-0313									
[10] Scott 6470-0313	TC-23C-249	x	x	x	—	x	—	—	FF
[11] Scott 6411-0315	TC-23C-250	x	x	x	—	x	x[2]	—	ON
6413-0315									
6421-0315									
6423-0315									
[11] Scott 6470-0315	TC-23C-251	x	x	x	—	x	x[2]	—	FF
Soctt 6411-0004	TC-23C-252	—	—	—	—	—	x[4]	—	ON
6413-0004									
6421-0004									
6423-0004									
Scott 6470-0004	TC-23C-253	—	—	—	—	—	x[4]	—	FF
[9] Scott 6411-0104	TC-23C-254	x	x	—	—	x	x[4]	—	ON
6413-0104									
6421-0104									
6423-0104									
[9] Scott 6470-0104	TC-23C-255	x	x	—	—	x	x[4]	—	FF
[10] Scott 6411-0304	TC-23C-256	x	x	x	—	x	x[4]	—	ON
6413-0304									

See footnotes at end of table.

Respirator	Approval No.	Approved for protection against not more than 1000 ppm organic vapors and . . .							Face-piece type[1]
		Pneumo-coniosis producing and toxic dusts (1)	Pneumo-coniosis producing and toxic mists (2)	Toxic fumes (3)	Mists of paints, lacquers, and enamels (4)	Asbestos dust and mists (5)	Miscel-laneous gases and vapors (6)	Pesticides (exept fumigants) (7)	
6421-0304									
6423-0304									
[11] Scott 6470-0304	TC-2-C-257	x	x	x	—	x	x[4]	—	FF
[9] Willson 122116	TC-23C-258	x	x	—	x	—	—	—	ON
122116S									
122116SR									
[9] Willson 162116	TC-23C-259	x	x	—	x	—	—	—	FF
172116									
[9] MSA 466903	TC-23C-260	x	x	—	—	x	x[2]	—	ON
[9] MSA 466902	TC-23C-261	x	x	—	—	—	x[2]	—	ON
[9] MSA-466904	TC-23C-262	x	x	—	—	—	x[2]	—	FF
[9] CESCO 96RC45	TC-23C-263	x	x	—	—	x	—	—	FF
[9] US Safety 151T23	TC-23C-264	x	x	—	—	x	—	—	FF
[9] CESCO 96RC75	TC-23C-265	x	x	—	—	x	x[3]	—	FF
[9] US Safety 151T25	TC-23C-266	x	x	—	—	x	x[3]	—	FF
[9] CESCO 96RC105	TC-23C-267	x	x	—	—	x	x[2]	—	FF
[9] US Safety 151T28	TC-23C-268	x	x	—	—	x	x[2]	—	FF
[9] CESCO 96RC95	TC-23C-269	x	x	—	—	x	x[4]	—	FF
[9] US Safety 151T27	TC-23C-270	x	x	—	—	x	x[4]	—	FF
CESCO 96RC35	TC-23C-271	—	—	—	x	—	—	—	FF
US Safety 151T24	TC-23C-272	—	—	—	x	—	—	—	FF
CESCO 96RC125	TC-23C-273	—	—	—	—	—	—	x	FF
US Safety 151T30	TC-23C-274	—	—	—	—	—	—	x	FF
[9] Cover 1482-G100-F108	TC-23C-275	x	x	x	—	—	—	—	ON
[9] Cover 1482-G100-F100	TC-23C-276	x	x	—	—	—	—	—	ON
DeVilbiss MSP-507	TC-23C-277	—	—	—	—	—	—	—	ON
[9] DeVilbiss MSP-506	TC-23C-278	x	x	—	x	—	—	—	ON
Cover 1482-G106	TC-23C-279	—	—	—	—	—	x[4]	—	ON
[9] Cover 2482-G106-F100	TC-23C-280	x	x	—	—	—	x[4]	—	ON
[9] AO 4563	TC-23C-281	x	x	x	—	—	x[2]	—	ON
5563									
6563									
[9] AO 7563	TC-23C-282	x	x	x	—	—	x[2]	—	FF
Scott 601460-01	TC-11-1	—	—	—	—	—	x[8]	—	ON
601460-03									
601460-11									
601460-13									

See footnotes at end of table.

[1] ON—orinasal; FF—full facepiece; HH—hood or helmet; M—mouthpiece
[2] Approved for protection against not more than 10 ppm chlorine, 50 ppm hydrogen chloride, or 50 ppm sulfur dioxide.
[3] Approved for protection against not more than 10 ppm chlorine, 50 ppm hydrogen chloride, or 50 ppm sulfur dioxide. *Not approved for organic vapors.*
[4] Approved for protection against not more than 300 ppm ammonia or 100 ppm methylamine. *Not approved for organic vapors.*
[5] Approved for protection against not more than 300 ppm ammonia. *Not approved for organic vapors.*
[6] Approved for protection against not more than 10 ppm chlorine.
[7] Approved for protection against not more than 10 ppm chlorine. *Not approved for organic vapors.*
[8] Approved for protection against not more than 10 ppm vinyl chloride.
[9] Approved for particulates having a permissible TWA level not less than 0.05 mg/m^3 or 2 mppcf.
[10] Approved for dusts, fumes, and mists having a permissible TWA level less than 0.05 mg/m^3 or 2 mppcf and against radionuclides.
[11] Approved for radon daughters and radon daughters attached to dusts, fumes, and mists.
[12] Data incorrect in NIOSH certified equipment list (DHEW (NIOSH) Publication No. 80-144).
[13] For 1482-G104-F100 only.
[14] For 8726 only.
[15] For 8728 only.
[16] Officially requested by Scott to be dropped.

PART III
GAS MASKS

Gask Mask	Approval No.	Approved for respiratory protection against—											Particulate Matter	
		Acid gases	Chlorine	Hydrocyanic acid	Hydrogen sulfide	Organic vapors	Petroleum vapors	Ammonia	Phosphine	Carbon monoxide	Methyl amine	Sulfur dioxide	Limited efficiency filter	High efficiency filter
Acme 679-1 and 679-1-P	BM-14F-18	—	—	—	—	x	—	—	—	—	—	—	—	—
Willson WIG, WIGW, and TIGW (G2)	BM-14F-23	—	—	—	—	x	—	—	—	—	—	—	—	—
Welsh 7815 and 7815T	BM-14F-27	—	x	—	—	—	—	—	—	—	—	—	—	—
Willson WLG, WGLW, and TLGW (LG1)	BM-14F-37	—	—	—	—	x	—	—	—	—	—	—	—	—
Willson WLG, WLGW, and TLCW (LG4)	BM-14F-38	—	—	—	—	—	—	x	—	—	—	—	—	—
Willson WUG, WUGW, and TUGW (N1W)	BM-14F-43A	x	—	—	—	x	—	x	—	x	—	—	x	—
Willson WTG, WTGW, and TTGW(LG9)	BM-14F-44	—	—	—	x	—	x	—	—	—	—	—	—	—
Willson WUG, WUGW, and TUGW (N2W)	BM-14E-45A	x	—	—	—	x	—	x	—	x	—	—	x	x
Willson WLG, WLGW, and TLGW (LG1G)	BM-14F-46	—	—	—	—	x	—	—	—	—	—	—	—	x
M-S-A Self-Rescuer 48391	BM-14F-47	—	—	—	—	—	—	—	x	·	—	—	—	—
Willson WLG, WGLW and TLGW (LG3)	BM-14F-50	x	—	—	—	x	—	—	—	—	—	—	—	—
Welsh 7814 and 7814T	BM-14F-52	—	—	—	—	—	—	x	—	—	—	—	—	—
Willson WTG, WIGW, and TIGW (G8)	BM-14F-53	—	x	—	—	—	—	—	—	—	—	—	—	—
Willson WIG, WIGW, and TIGW, (G4)	BM-14F-54	—	—	—	—	—	—	x	—	—	—	—	—	—
Acme 677-1, 677-1-P, 677-1W, and 677-1-PW	BM-14F-55	—	—	—	—	—	—	x	—	—	—	—	—	—
M-S-A 84867, 86197, 86198, 86171, 457081, and 457077	BM-14F-56	—	—	—	—	x	—	—	—	—	—	—	x	—
M-S-A 86175, 846891, 846883, 86223, 86224, 457070, 457085, and 457065	BM-14F-57	—	—	—	—	x	—	—	—	—	—	—	x	—
M-S-A 81869, 86199, 86200, 86172, 457082, and 457078	BM-14F-58	—	—	—	—	—	—	x	—	—	—	—	x	—
M-S-A 86177, 84899, 84881, 86221, 86222, 457072, 457086, and 457066	BM-14F-59	—	—	—	—	—	—	x	—	—	—	—	x	—
M-S-A 84871, 86201, 86202, 86173, 457083, and 457080	BM-14F-60	—	x	—	—	—	—	—	—	—	—	—	x	—
M-S-A 84879, 84893, 84885, 86225, 86226, 457069, 457087, and 457067	BM-14F-61	—	—	—	x	x	—	—	x	—	—	—	x	—
M-S-A 84873, 86203, 86204, 86174, 457084, and 45709	BM-14F-62	—	—	x	—	—	—	—	—	—	—	—	x	—
M-S-A 86178, 86113, 86115, 86229, 86230, 457073, 457088, and 457132	BM-14F-63	—	—	x	—	—	—	—	—	—	—	—	x	—
M-S-A 86176, 86109, 86111, 86227, 86228, 457071, 457089, and 457068	BM-14F-64	x	—	—	—	x	—	—	—	—	—	—	x	—
[1] M-S-A 84877, 86207, and 86208	BM-14F-65	x	—	—	—	x	—	x	—	x	—	—	x	—

See footnotes at end of table.

Gask Mask	Approval No.	Approved for respiratory protection against—											Particulate Matter	
		Acid gases	Chlorine	Hydrocyanic acid	Hydrogen sulfide	Organic vapors	Petroleum vapors	Ammonia	Phosphine	Carbon monoxide	Methyl amine	Sulfur dioxide	Limited efficiency filter	High efficiency filter
[1] M-S-A "All Service"	BM-14F-65A	x	—	—	—	x	—	x	—	x	—	—	x	—
M-S-A 86217, 86209, and 86210	BM-14F-66	x	—	—	—	x	—	x	—	x	—	—	x	x
M-S-A 86218, 86211, 86212, 85859, 457076, and 457074	BM-14F-66A	x	—	—	—	x	—	x	—	x	—	—	x	x
Willson WLG, WLGW, and TLGW (LG10)	BM-14F-68	—	—	—	—	x	—	—	x	—	—	—	—	—
Willson, WLG, WLGW, and TLGW, (LG10G)	BM-14F-69	—	—	—	—	x	—	—	x	—	—	—	x	x
Acme 668-1	BM-14F-70	—	—	—	—	x	—	—	x	—	—	—	x	x
Welsh 7811 and 7811T	BM-14F-71	—	—	—	—	x	—	—	—	—	—	—	x	—
Pulmosan 1806	BM-14F-72	—	x	—	—	—	—	—	—	—	—	—	—	—
Pulmosan 1803	BM-14F-73	—	—	—	—	—	—	x	—	—	—	—	—	—
Pulmosan 1801F	BM-14F-74	—	—	—	—	x	—	—	—	—	—	—	x	—
Scott/Acme 691-1, 691-2, and 691-1P	BM-14F-75	x	—	—	—	x	—	—	—	—	—	—	—	—
Scott/Acme 184-CL and 184-CL-W	BM-14F-77	—	x	—	—	—	—	—	—	—	—	—	—	—
Welsh 7831 and 7831T	BM-14E-78	x	—	—	—	x	—	x	—	x	—	—	x	—
Welsh 7832 and 7832T	BM-14E-79	x	—	—	—	x	—	x	—	x	—	—	x	x
Drager Self-Rescuer No. 810	BM-14F-80	—	—	—	—	—	—	—	—	x	—	—	—	—
Scott/Acme Self-Rescuer 8164	BM-14F-81	—	—	—	—	—	—	—	—	x	—	—	x	—
M-S-A Self-Rescuer 455299 (escape only)	TC-14G-82	—	—	—	—	—	—	—	—	x	—	—	—	—
Drager Self-Rescue Model 810 (escape only)	TC-14G-83	—	—	—	—	—	—	—	—	x	—	—	—	—
MSA 416481, 461482, 461483, 461484, 461485, 461486 with 416480 canister	[2] TC-14G-84													
Scott 601211-17, 601221-17, 601111-17, 601121-17, 601511-17, 601521-17 (with 083-VOL canister)	[2] TC-14G-85													
MSA 448983, 448984, 448985, 448986 (with 448972 canister)	[3] TC-14G-86						—	—	—	—	—	—	—	x
MSA 448975, 448976, 448977, 448978 (with 448974 canister)	TC-14G-87	—	—	—	—	x	—	—	—	—	—	—	x[4]	—
MSA 448979, 448980, 448981, 448982 (with 448973 canister)	TC-14G-88	—	—	—	—	—	—	x	—	—	—	—	x[4]	—
MSA 460131, 460132, 460133, 460134 (with 460113 canister)	TC-14G-89	—	x	—	—	—	—	—	—	—	—	—	x[4]	—
Norton 7820, 7820S, 7820N, 7829, 7829S, 7820AN, 7829N, 7829SN	[2] TC-14G-91													
MSA 461133, 461134, 461140, 461141	TC-14G-92	—	—	—		—	—	—	—	—	—	x	x[4]	—
Willson 2164F and 2264F	TC-14G-93	—	—	—	—	—	—	x	—	—	x	—	x[5]	—
Willson 2161F and 2261F	[3] TC-14G-94	—	—	—	—	x	—	—	—	—	—	—	x[5]	—
Willson 2162F and 2262F	TC-14G-95	—	x	—	—	—	—	—	—	—	—	—	x[6]	—

See footnotes at end of table.

Gask Mask	Approval No.	Approved for respiratory protection against—											Particulate Matter	
		Acid gases	Chlorine	Hydrocyanic acid	Hydrogen sulfide	Organic vapors	Petroleum vapors	Ammonia	Phosphine	Carbon monoxide	Methyl amine	Sulfur dioxide	Limited efficiency filter	High efficiency filter
MSA 465331 and 465327	TC-14G-96	x	—	—	—	x	—	—	—	x	—	x	x[7]	X
MSA 448932, 448933, 448934, 448935, 448920, 448921, 448922, 448923, 448924, 448925	TC-14G-97	—	—	—	—	x	—	—	—	—	—	—	x[4]	—
MSA 460125, 460126, 460127, 460128, 460129, 460130	TC-14G-98	—	x	—	—	x	—	—	—	—	—	—	x[4]	—
MSA 448940, 448941, 448942, 448943	[3] TC-14G-99													
MSA 460119, 460120, 460121, 460122, 460123, 460124	TC-14G-100	x	—	—	—	x	—	—	—	—	—	—	x[4]	—
MSA 448926, 448927, 448928, 448929, 448930, 448931	TC-14G-101	—	—	—	—	—	—	x	—	—	—	—	x[4]	—
Scott 6030-1108, 6030-1208, 6030-2208, 6030-2108, 6030-3108, 6030-3208, 6030-4108, 6030-4208	TC-14G-102	—	x	—	—	—	—	—	—	—	—	—	x[4]	—
Scott 6030-1104, 6030-1204, 6030-2104, 6030-2204, 6030-3104, 6030-3204, 6030-4104, 6030-4204	TC-14G-103	—	—	—	—	—	—	x	—	—	x	—	x[4]	—
Scott 6030-1113, 6020-1213, 6030-2113, 6030-2213, 6030-3113, 6030-3213, 6030-4113, 6030-4213	TC-14G-104	—	—	—	—	x	—	—	—	—	—	—	x[6]	—
MSA 466225 and Y66226	TC-14G-105	—	x	—	—	—	—	—	—	—	—	—	—	x
MSA 466231 and 466232	TC-14G-106	—	x	—	—	—	—	—	—	—	—	—	—	x
MSA 46227, 466351, 466228, 466350	TC-14G-107	x	—	—	—	x	—	—	—	—	—	—	x[4]	—
SMA 466229 and 466230	TC-14G-108	—	—		—	x	—	—	—	—	—	—	—	x
MSA 448936, 448937, 448938, 448939	TC-14G-109	—	—	—	—	—	—	x	—	—	—	—	x[4]	—
Norton 7601L, 7601LN, 7601LS, 7601LSN	TC-14G-110	—	—	—	—	x	—	—	—	—	—	—	—	—

[1] Approved by NIOSH for protection against pesticides.
[2] Approved for protection against vinyl chloride.
[3] Approved for protection against pesticides.
[4] Approved for dusts and mists.
[5] Approved for dusts, fumes, and mists.
[6] Approved for dusts, fumes, mists, and asbestos.
[7] Approved for dusts, fumes, mists, radon daughters and radon daughters attached to dusts, fumes, and mists.

PART IV
SUPPLIED AIR RESPIRATORS

Respirator	Approval No.	Type	Half-mask	Full facepiece	Hood or helmet	Hose length* (ft)	Pressure range (psi)
US Safety Service, PI-800 Series	TC-19C-64	Continuous flow Type C or CE	x	—	—	15-50 75-100	6-17 7-20
CESCO PI-800 Series	TC-19C-64	do	x	—	—	15-50 75-100	6-17 7-20
SurvivAir part numbers 9011-12 and 9811-12	TC-19C-65	Demand flow Type C	—	x	—	4-250	50-125
SurvivAir part numbers 9011-14 and 9811-14	TC-19C-66	do	—	x	—	4-250	50-125
SurvivAir part numbers 9011-13 and 9811-13	TC-19C-67	Pressure-demand, Type C	—	x	—	4-250	50-125
SurvivAir part numbers 9011-15 and 9811-15	TC-19C-68	do	—	x	—	4-250	50-125
3M part numbers W-840, W-810, W-870, W-858, W-856, W-275 and W-280	TC-19C-69	Type C or CE	x	x	x	25-300	50-90
3M part numbers W-820, W-888, W-890, W-880, W-881, W-276 and W-281	TC-19C-70	do	—	—	x	25-100	65-90
Scott catalog numbers 4616-11, -12, -15, -21, and -25; and 4622-11, -12, -15, -21, and -25; and 4622-11, -12, -15, -21, -25 with 4266-15, and 4264-50 air supply hose	TC-19C-71	Continuous flow Type C	x	x	—	15-50 50-250	12-25 25-40
Scott catalog numbers 4616-18, -19, -28, and -29; and 4622-18, -19, -28, and -29 with 4259-15, 4258-25, and 4257-50 air supply hose	TC-19C-72	do	x	x	—	15-50 50-250	6-16 16-22
Scott catalog numbers 802230 with 26025 harness and 30010 or 30020 air supply hose	TC-19C-73	Demand flow or Continuous flow Type C	—	x	—	25-250	60-125
Scott catalog numbers 801548 with 26025 harness, and 30010 or 30020 air supply hose	TC-19C-74	Pressure-demand Type C	—	x	—	3-250	60-125
M-S-A 457165, 84283, 46539, 457164, 93928, and 94988	TC-19C-75	Demand flow Type C	x	x	—	25-300	50-125
M-S-A 457623	TC-19C-77	Demand flow, Type B	—	x	—	up to 75	N/A
M-S-A 460862, 460863, 460864, 460865, 461708, 461717, 461718, and 461719	TC-19C-78	Continuous flow Type C	x	x	—	25-300	35-40
Encon 6400	TC-19C-79	Continuous flow Type C or CE	x	—	—	25-50	70-90
M-S-A 460903, 460904, 460905, 460906, 461709, 469710, 461711, and 461712	TC-19C-80	Continuous flow Type C	x	—	—	25-300	55-60

See footnote at end of table.

Respirator	Approval No.	Type	Half-mask	Full facepiece	Hood or helmet	Hose Length* (ft)	Pressure range (psi)
M-S-A 460907, 460908, 460909, 460910, 461713, 461714, 461715, and 461716	TC-19C-81	Continuous flow Type C	x	—	—	25-300	55-60
Pulmosan AL180 #10168	TC-19C-82	Continuous Type C	—	x	—	15-50	10-20
Willson 1810 and 1820	TC-19C-83	Continuous flow Type C	x	—	—	15-100 100-300	10-32 21-50
Bullard 77	TC-19C-84	Continuous flow Type C and CE	x	—	—	25-200	80-95
Anderson 77	TC-19C-84	do	x	—	—	25-200	80-95
Bowen 77	TC-19C-84	do	x	—	—	25-200	80-95
Pauli and Griffin 77	TC-19C-84	do	x	—	—	25-200	80-95
Empire 77	TC-19C-84	do	x	—	—	25-200	80-95
Chemtex, Ltd. 77	TC-19C-84	do	x	—	—	25-200	80-95
Kelco 77	TC-19C-84	do	x	—	—	25-200	80-95
Titan 77	TC-19C-84	do	x	—	—	25-200	80-95
Key Houston 77	TC-19C-84	do	x	—	—	25-200	80-95
Ace Enterprises 77	TC-19C-84	do	x	—	—	25-200	80-95
Chemco 46 (PCE)	TC-19C-85	do	x	—	—	25-200	80-95
A.O. R6099, R5099	TC-19C-86	Continuous flow Type C	x	—	—	12.5-75 100-175 200-300	7-15 13-25 18-25
3M W-270-L, -M, -S, W-271, W-272, W-274-L, -M, -S, W-277, W-282, W-285, W-288, W-294	TC-19C-87	Continuous flow Type C and CE	—	—	x	25-100	60-70
Binks 40-160	TC-19C-88	Continuous flow Type C	x	—	—	25-300	35-40
A.O. R56001	TC-19C-89	do	—	—	x	12.5-25 50-100 125-200 225-300	10-18 18-30 25-40 35-60
Robertshaw Controls 900-002-264-01, -02, -03 -04, -11, -12, -13, -14	TC-19C-90	Pressure demand Type C	x	x	—	25-250	50-125
MSA 457157, 93224, 93225	TC-19C-91	Demand, Type C	x	x	—	25-300	50-90
Globe 2185-6 and 2185-4	TC-19C-92	Continuous flow and demand Type C	—	x	—	25-200	60-70
MSA 89104, 461669, 461700	TC-19C-93	Pressure demand Type C	—	x	—	25-300	80-100
Willson 1850 and 1860	TC-19C-94	Continuous flow Type C	—	x	—	15-100 100-300	11-32 21-50

See footnote at end of table.

Respirator	Approval No.	Type	Half-mask	Full facepiece	Hood or helmet	Hose length* (ft)	Pressure range (psi)
Pulmosan 10159 and 10237	TC-19C-95	do	x	—	—	15-50	20-40
Cesco 801	TC-19C-96	Continuous flow Type C or CE	—	—	x	15-100	60-100
US Safety 801	TC-19C-96	do	—	—	x	15-100	60-100
Scott 802280-01, -02, -05, -06, -09, -10, -13, -14	TC-19C-97	Continuous flow and demand Type C	x	—	—	3-250	60-125
Scott 802280-03, -04, -07, -08, -11, -12, -15, -16	TC-19C-98	Pressure demand Type C	x	—	—	3-250	60-125
Pulmosan 20009	TC-19C-99	Continuous flow Type CE	—	—	x	15-50	12-15
Pulmosan 20027	TC-19C-100	do	—	—	x	15-50	11-14
MSA 463108, 463019, 463020, 4632021, 463022, 463023, 463024, 463025	TC-19C-101	Continuous flow Hose mask with blower	—	x	—	50-250	N/A
Bullard 999-3, 999-5, 999-6	TC-19C-102	Continuous flow Type C and CE	—	—	x	10-100	12-25
Clemco 999-54-3, 999-54-4, 999-54-5	TC-19C-102	do	—	—	x	10-100	12-25
MSA 463925, 463926, 463970, 463973, 463974, 463986, 463987	TC-19C-103	Continuous flow type C	—	—	x	25-300	45-60
MSA 463971, 463972, 463975, 463976, 463984, 463985, 463988, 463989	TC-19C-104	do	—	—	x	15-50	16-20
MSA 463939, 463979	TC-19C-105	Continuous flow Type CE	—	—	x	25-300	45-60
MSA 463980, 463981	TC-19C-106	do	—	—	x	15-50	16-20
MSA 463929, 463930, 463959, 463962, 463963, 463967	TC-19C-107	do	—	—	x	25-300	45-60
MSA 463960, 463961, 463964 463965, 463968, 46369	TC-19C-108	do	—	—	x	15-50	16-20
Norton 85101 through 85126	TC-19C-109	Continuous flow Type C	x	—	—	12.5-25	8-9
						50-75	10-11
						100-150	12-13
						175-300	17-18
Norton 85201 through 85226	TC-19C-110	do	—	x	—	12.5	8-9
						25-75	10-11
						75-150	12-13
						175-300	17-18
AO 50734	TC-19C-111	Continuous flow Type C	—	x	—	25	8-11
						50-75	11-15
						100-125	14-18
						150-200	18-23
						225-300	21-28
Glendale GR 5000 and GR 6000	TC-19C-112	do	x	x	—	25-300	30-35

See footnote at end of table.

Respirator	Approval No.	Type	Half-mask	Full facepiece	Hood or helmet	Hose length* (ft)	Pressure range (psi)
MSA 463281, 463300, 463301, 463302, 463277, 463297, 463298, 463299	TC-19C-113	do	—	x	—	15-50	10-15
Binks 40-140	TC-19C-114	do	—	x	—	15-20	10-15
MSA 463293, 463307, 463305, 463309, 463294, 463308, 463306, 463310	TC-19C-115	do	—	—	x	15-50	16-20
MSA 463295, 463291, 463303, 463296, 463292, 463304, 463312, 463311	TC-19C-116	Continuous flow Type CE	—	—	x	15-50	16-20
MSA 463924 and 463982	TC-19C-117	do	—	—	x	25-300	75-100
MSA 463927, 463928, 463978, 463977	TC-19C-118	Continuous flow Type C	—	—	x	25-300	75-100
MSA 463935, 463956, 463957, 463958, 463936, 463966	TC-19C-119	Continuous flow Type CE	—	—	x	75-300	75-100
Defense Apparel - HSQ-10 Nucon Products	TC-19C-120	Continuous flow Type C	—	—	x	50-100	25-35
Cesco 97 Safety Products	TC-19C-121	do	x	—	—	25-300	35-40
US Safety Service 152	TC-19C-122	do	x	—	—	25-300	35-40
3M W-298	TC-19C-123	do	x	—	—	25 50 100	6-16 7-16 11-22
Safety and Supply RC2095	TC-19C-124	Continuous flow Type C	—	—	x	25 50 100 150 200 250	18-29 23-26 28-42 32-47 35-51 37-57
DeVilbiss MPH-532	TC-19C-125	do	x	—	—	15-100 100-300	10-32 21-50
US Safety Service 153	TC-19C-126	do	—	—	x	25-300 (max. 7 lengths)	35-60
Cesco 98	TC-19C-127	do	—	—	x	25-300 (max. 7 lengths)	35-60
Standard Safety Equipment SD-5890	TC-19C-128	do	—	—	x	50-100	40-60

* Absence of hose length does not necessarily mean there is no maximum length.

PART V
SELF-CONTAINED BREATHING APPARATUS

Apparatus	Approval* No.	Breathing gas source	Approved service life	Type of apparatus	Hose length (ft)	Pressure range (psi)
M-S-A Cat. No. 70001 McCaa	BM-1303	Compressed oxygen	2 hours	Closed circuit	—	—
M-S-A Cat. Nos. 48439 and 458313	BM-1303S	do	do	do	—	—
M-S-A Chemox Cat. Nos. 96578 and 458310	BM-1307	Oxygen-operating canister	1 hour	do	—	—
Scott-Air-Pak Model No. 6000A2MS	BM-1308	Compressed air	½ hour	Open-circuit demand	—	—
Scott-Air-Pak Model No. 6000A2MSP	BM-1308, 13D-08	do	do	Open-circuit demand and pressure-demand	—	—
Scott-Air-Pak I Model No. 900000 series	BM-13D-08, 13E-08	do	do	Open-circuit demand	—	—
Scott-Air-Pak II Model No. 900014 series	BM-13D-08, 13E-08	do	do	Open-circuit demand and pressure demand	—	—
M-S-A Cat. No. 95766	BM-13D-10	do	do	Open-circuit demand	—	—
M-S-A Cat. Nos. 93181 and 95767	BM-13D-10	do	do	Open-circuit pressure-demand	—	—
M-S-A Cat. Nos. 95066 and 457153	BM-13E-10	do	do	Open-circuit demand	—	—
M-S-A Cat. No. 95069	BM-13E-10	do	do	Open-circuit pressure-demand	—	—
Globe Guardsman part Nos. 2275-2GA and 2295-2GA	BM-13D-11	do	do	Open-circuit demand	—	—
Globe Guardsman part No. 2526-2	BM-13E-11	do	do	do	—	—
US Divers Model No. 930	BM-13D-12	do	do	do	—	—
US Divers Model No. 9030-20	BM-13D-12	do	do	Open-circuit pressure demand	—	—
Aro Models LP-1-A and LPA	BM-13D-14	Liquid Air	2 hours	Open-circuit pressure-demand	—	—
Aro Models LP 1-0 and LPO	BM-13D-15	Liquid oxygen	do	do	—	—
Drager BG-174	BM-13D-16	Compressed oxygen	do	Closed circuit	—	—
M-S-A Cat. No. 95063	BM-13E-21	Compressed air	½ hour	Open-circuit pressure-demand	—	—
Scott part Nos. 900002 and 9000015	BM-13E-22	do	15 min	Open-circuit demand and pressure-demand. Escape.	—	—
M-S-A Cat. No. 96359	BM-13E-23	do	10 min	Open-circuit pressure-demand; combination escape apparatus and Type C supplied-air respirator.	—	—
US Divers Model No. 9038	BM-13E-24	Compressed air	½ hour	Open-circuit demand	—	—
US Divers Model No. 9038-20	BM-13E-24	do	do	Open-circuit demand and pressure-demand	—	—
Scott part No. 900050	BM-13E-25	Compressed oxygen	4 hours	Closed circuit	—	—
Drager BG-174A	BM-13E-26	do	3 hours	do	—	—
BioMarine 45-600, 45-100 with 45-200 canister	TC-13F-27	do	45 min	do	—	—
Robertshaw controls 900-002-268, -11, -12 model 50000	TC-13F-28	Compressed air	See next column	Combination continuous flow respirator with 5 minute cylinder for escape.	—	—

*For Bureau of Mines approval extensions, refer to appendix D.

Apparatus	Approval* No.	Breathing gas source	Approved service life	Type of apparatus	Hose length (ft)	Pressure range (psi)
Lear Siegler 5500	TC-13F-28A		do	do	—	—
MSA 457152, 457153, 457154, 463827, 463830, 95066, 96363, 463832, 463828	TC-13F-29	Compressed air	20	Demand type	—	—
MSA 95069, 96338, 461696, 461946, 461947, 463814, 463815, 461704, 463831, 463833	TC-13F-30	do	do	Pressure-demand type	—	—
Siebe-Gorman 013831.04 with 029697.01 canister	TC-13F-32	Compressed oxygen	3 hour	Demand type	—	—
SurvivAir 9081-14 and 9881-14	TC-13F-33	Compressed air	See next column	Combination type C demand-type supplied air respirator with 5-minute demand type compressed air cylinder for escape only.	4-250	50-125
SurvivAir 9081-12 and 9881-12	TC-13F-34	do	do	do	4-250	50-125
SurvivAir 9065-03 and 9865-03	TC-13F-35	do	15 min	Demand-type, for escape only	—	—
SurvivAir 9069-02, 9069-11, 9869-02, and 986911	TC-13F-36	do	5 min	Demand-type, for escape only	—	—
Drager BG-174A	TC-13F-38	Compressed oxygen	3 hour	Closed circuit	—	—
Scott 900000-00	TC-13F-39	Compressed air	½ hour	Demand-type	—	—
Scott 900014-00	TC-13F-40	do	½ hour	Pressure-demand type	—	—
Scott 9000002-00	TC-13F-41	do	15 min	Demand-type	—	—
Scott 900015-00	TC-13F-42	do	do	Pressure-demand type	—	—
Globe 2540-W, 2540-B, 2550-W, 2526-W, 2526-B, 2552-W, 2552-B	TC-13F-43	do	½ hour	Demand type	—	—
SurvivAir 9038-00, 9038-02, 9838-00, and 9838-22	TC-13F-44	do	do	Demand-type	—	—
SurvivAir 9038-20, 9038-22, 9838-20, and 9838-22	TC-13F-45	do	do	Pressure-demand type	—	—
M-S-A 457150, 95061, 457151, 95068	TC-13F-46	do	15 min	Demand-type	—	—
M-S-A 95063, 460262, 461697 and 457151	TC-13F-47	do	15 min	Pressure-demand type	—	—
Scott 900006	TC-13F-48	do	See next column	Combination type C demand-type supplied air respirator with 3-minute (22034-01) or 5-minute cylinder (22034-02/03) for escape.	25-300	350-450
Scott 900007	TC-13F-49	do	See next column	Combination type C pressure-demand supplied air respirator with 3-minute (22034-01) or 5-minute cylinder (22034-02/03) for escape.	25-300	350-450
M-S-A 457156	TC-13F-52	do	5 min	Demand-type, for escape only	—	—

*For Bureau of Mines approval extensions, refer to appendix D.

Apparatus	Approval* No.	Breathing gas source	Approved service life	Type of apparatus	Hose length (ft)	Pressure range (psi)
SurvivAir 9081-13 and 9881-13	TC-13F-53	do	See next column	Combination type C pressure-demand supplied air respirator with 5-minute cylinder for escape.	4-250	50-125
SurvivAir 9081-15 and 9881-15	TC-13F-54	do	See next column	Combination type C pressure-demand supplied air respirator with 5-minute cylinder for escape.	4-250	50-125
M-S-A 76753	TC-13F-55	do	5 min	Demand-type, for escape only	—	—
MSA 96395 and 455994	TC-13F-56	Compressed air	See next column	Combination type C pressure-demand supplied air respirator with 10-minute cylinder for escape.	25-300	75-90
MSA 304213 and 304194	TC-13F-56A	do	do	do	25-300	75-90
Drager BG-174A/4	TC-13F-57	Compressed oxygen	4 hour	Closed-circuit	—	—
Siebe-Gorman 014422.10	TC-13F-58	Compressed air	30 min	Open circuit demand type	—	—
Siebe-Gorman 014422.11	TC-13F-59	do	do	Open circuit, pressure-demand type	—	—
Scott 900050	TC-13F-60	Compressed oxygen	4 hour	Closed-circuit	—	—
MSA 456989	TC-13F-61	Compressed air	5 min	Demand-type, for escape only	—	—
MSA 458178 and 458479	TC-13F-62	do	See next column	Combination type C demand type supplied air respirator with 5-minute cylinder for escape.	25-300	50-90
Robertshaw 900-002-267 controls -01, -11	TC-13F-63	do	See next column	Combination type C pressure-demand supplied air respirator with 15-minute cylinder for escape.	25-250	50-125
Robertshaw 900-002-266 controls -01, -02, -03, -04, -11, -12, -13, -14	TC-13F-64	do	See next column	Combination type C pressure-demand supplied air respirator with 5-minute cylinder for escape.	25-250	50-125
Robertshaw 900-002-267 controls -21, -31	TC-13F-65	do	15 min	Pressure-demand type	—	—
Scott 900055-01, 900055-03, 900055-04	TC-13F-66	do	5 min	Demand-type, for escape only	—	—
Scott 900055-09, -10, -17, -18	TC-13F-67	do	See next column	Combination type C demand-type supplied air respirator with 5-minute cylinder for escape.	10-250	60-125
Scott 900055-13, and -14	TC-13F-68	do	do	Combination type C pressure-demand supplied air respirator with 5-minute cylinder for escape.	10-250	60-125
MSA 457159	TC-13F-69	do	do	Combination type C demand type supplied air respirator with 5-minute cylinder for escape.	25-300	50-100
MSA 460713 and 46198	TC-13F-70	do	do	Combination type C pressure-demand supplied air respirator with 5-minute cylinder for escape.	25-300	50-100

*For Bureau of Mines approval extensions, refer to appendix D.

Apparatus	Approval* No.	Breathing gas source	Approved service life	Type of apparatus	Hose length (ft)	Pressure range (psi)
Globe 2508	TC-13F-71	Compressed air	5 min	Demand type, for escape only	—	—
Globe 2509	TC-13F-72	do	See next column	Combination type C demand type supplied air respirator with 5-minute cylinder for escape.	25-300	50-100
Scott 900450	TC-13F-73	do	30 min	Demand-type	—	—
Globe 2505 and 2505-4	TC-13F-74	do	See next column	Combination type C demand type supplied air respirator with 15-minute cylinder for escape.	25-100	50-70
Globe 2503	TC-13F-75	do	15 min	Demand type, for escape only	—	—
Scott 900455	TC-13F-76	do	30 min	Pressure-demand type	—	—
MSA 304330	TC-13F-77	Oxygen generator	10 min, 60 min	(Experimental only; not in production)	—	—
MSA 464213	TC-13F-78	do	1 hr	Closed-circuit, for escape only	—	—
Scott 900220	TC-13F-79	Compressed air	30 min	Demand-type	—	—
Scott 900225	TC-13F-80	do	do	Pressure-demand type	—	—
Globe 2840-W	TC-13F-81	do	do	Pressure-demand type	—	—
SurvivAir 9045-20 and -22, 9845.20 and -22	TC-13F-82	do	do	Pressure-demand type	—	—
MSA 465251	TC-13F-83	Compressed air	5 min	Demand type for escape only	—	—
Bio Marine Bio Pak 30	TC-13F-84	Compressed oxygen	30 min	Closed circuit Pressure-demand type	—	—
Bio Marine Bio Pak 60	TC-13F-85	do	60 min	Closed circuit Pressure-demand type	—	—
SurvivAir 00028-00	TC-13F-86	Compressed air	5 min	Continuous flow for escape only	—	—
Drager OXY-SR60A	TC-13F-87	Compressed oxygen	60 min	Continuous flow for escape only	—	—
Scott 802300-02	TC-13F-88	do	15 min	Continuous flow for escape only	—	—
MSA 465182, 465183, 465185, 465186, 465199, 465200, 465202, 465203	TC-13F-89	Compressed air	30 min	Combination type C demand type supplied-air respirator with 30-minute cylinder for escape	25-300	50-100
MSA 465188, 465189, 465191, 465192, 465205, 465206, 465208, 465209	TC-13F-90	do	do	Combination type C pressure demand type supplied-air respirator with 30-minute cylinder for escape	25-300	50-100
MSA 465184, 465187, 465201, 465204	TC-13F-91	Compressed air	15 min	Combination type C demand-type supplied-air respirator with 15-minute cylinder for escape	25-300	50-100
MSA 465190, 465193, 465207, 465210	TC-13F-92	do	do	Combination type C pressure-demand type supplied-air respirator with 15-minute cylinder for escape	25-300	50-100

*For Bureau of Mines approval extensions, refer to appendix D.

Table 3. Air Purifying Respirators and Gas Masks Available in the Federal Supply System

*NSN**	*Respirator*
4240-01-935-9250	Respirator, Air Filtering, for pesticides (respirator furnished with 50 cartridges and 100 filters).
4240-00-084-9394	Respirator, Air Filtering, for dusts (respirator furnished with 50 filters)
4240-00-099-6939	Respirator, Air Filtering, for metal fumes (respirator furnished with 100 filters, or 50 filters depending on whether the mask is dual or single element).
4240-00-022-2524	Respirator, Air Filtering, for paint spray (respirator furnished with 100 or 50 cartridges and filters).
4240-01-015-5194	Respirator, Air Filtering, for organic vapors (respirator furnished with 100 or 50 cartridges)
4240-00-268-9735	Mask, Gas, Acid and Organic Vapors, M10.
4240-00-540-2404	Mask, Gas, All purpose M11A1.
4240-00-268-9736	Mask, Gas, Ammonia, M12.
4240-00-723-5472	Mask, Gas, Rocket Propellent, Small ABC-M21.
4240-00-723-5471	Mask, Gas, Rocket Propellent, Medium.
4240-00-725-7490	Mask, Gas, Rocket Propellent, Large.

* Replacement cartridges/canisters are not available in the Federal supply system since it is impractical to maintain stocks of cartridges/canisters made by several manufacturers.

APPENDIX C

PRIMARY MEANS OF GAS MASK CANISTER IDENTIFICATION

C-1. **On each canister shall appear** in bold letters the following on the most conspicuous surface or surfaces of the canister:

CANISTER FOR _____
(Name for atmospheric contaiminant)

In addition, essentially the following wording shall appear beneath the appropriate phrase on the canister label: FOR RESPIRATORY PROTECTION IN ATMOSPHERES CONTAINING NOT MORE THAN _____ PERCENT BY VOLUME OF _____

C-2. **Canisters having a special high-efficiency** filter for protection against radionuclides and highly toxic particulates 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.

C-3. **Each canister shall have** a label warning that gas masks should be used only in atmospheres that are not oxygen-deficient, since gas mask canisters are only designed to neutralize or remove contaminants from the air.

Atmospheric contaminants to be protected against	*Colors assigned* ***
Acid gases.	White.
Hydrocyanic acid gas.	White with ½ inch green stripe completely around the canister near the bottom.
Chlorine gas.	White with ½-inch yellow stripe completely around the canister near the bottom.
Organic vapors.	Black.
Ammonia gas.	Green.
Acid gases and ammonia gas.	Green with ½ inch white stripe completely around the canister near the bottom.
Carbon monoxide.	Blue.
Acid gases and organic vapors.	Yellow.
Hydrocyanic acid gas and chloropicrin vapor.	Yellow with ½-inch blue stripe completely around the canister near the bottom.
Acid gases, organic vapors and ammonia gases.	Brown.
Radioactive materials, except tritium and noble gases.	Purple (Magenta).
Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors.	Canister color for contaminant, as designated above, with ½-inch gray stripe completely around the canister near the top.
All of the above atmospheric contaminants.	Red with ½-inch gray stripe completely around the canister near the top.

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

** 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.

APPENDIX D

EXPIRATION OF BUREAU OF MINES BM) APPROVALS

D-1. Respirators, combinations of respirators, and gas masks shall be MSHA approved for use in hazardous atmospheres where they are maintained in an approved condition and are the same in all respects as those devices for which a certificate of former BM approval has been issued.

D-2. Self-contained breathing apparatus, supplied-air respirators and gas masks approved under the former BM approved program shall continue to be accepted for use in hazardous atmospheres according to the schedule set forth below, provided they:

a. Were fabricated, assembled or built under an approval or any modification thereof issued by the US Bureau of Mines, Department of the Interior; and

b. Were purchased on or before the date specified therein; and

c. Are maintained in an approved condition.

Type of device	Use	Bureau of Mines approved devices	Purchased on or before	Approved for use
Self-contained breathing apparatus.	Mine rescue efforts only.	Approval Nos. 1303, 1303S, 1307, 13D-14, 13D-15, 13D-16, 13E-25, and 13E-26.	30 June 1975	Further notice
	Other than mine rescue as permitted or required by regulation	Schedule 13 through 13-E devices that are equipped with an audible end of service life indicator.	30 June 1975	Further notice
Supplied-air respirators.	As permitted or required by regulation.	Schedule 19B, April 19, 1955.	30 June 1975	31 March 1980
Gas masks.	As permitted or required by regulation.	Schedule 14F, April 23, 1955.	At any time	Further notice

Following these deadline dates, only NIOSH "TC" approved respiratory protective equipment shall be used.

Note. Extension of these Schedule deadline dates may be made by the appropriate authority within DA or DLA. An example of the DA Temporary Extension of Approvals for Dust, Fume, Mist, Organic Vapor, and Paint Spray Respirators follows:

Respirators bearing BM approval numbers beginning with 21B or 23B are considered acceptable for use until present stocks of respirators or respirator replacement parts are depleted. New procurements must bear NIOSH nt parts are depleted. New procurements must bear NIOSH tested and certified numbers to be considered acceptable.

The BM-approval criteria plus Department of Defense procurement controls meet or exceed current NIOSH-approval criteria. Extension of approvals for these respirators is therefore considered appropriate.

APPENDIX E

NAMES AND ADDRESSES OF MANUFACTURERS AND DISTRIBUTORS

Ace Enterprises, 820 Northwest 144th St, Miami, FL 33168.
Acme Automotive Finishes, 101 Prospect Avenue, Cleveland, OH 44115.
American Optical Corp, Safety Products Div, 100 Canal St, Putnam, CT 06260.
Anderson Manufacturing Co, 1014 Fox Chase Road, Rockledge, PA 19111.
Binks Manufacturing Co, 9201 W. Belmont Ave, Franklin Park, IL 60131.
BioMarine Industries, Inc, 45 Great Valley Center, Malvern, PA 19355.
Bowen Tools, Inc, PO Box 3186, Houston, TX 77001.
Bullard, E. D., Co, 2680 Bridgeway, Sausalito, CA 94965.
Cesco Safety Products, Parmelee Industries, Inc, PO Box 1237, Kansas City, MO 64141.
Clemco Industries, 2177 Jerrold Ave, San Francisco, CA 94124.
Clemtex, Ltd, 248 McCarthy Drive, Houston, TX 77020.
Cover, H. S., Co, 107 East Alexander St, Buchanan, MI 49107.
DeVilbiss Co, 300 Phillips Ave, PO Box 913, Toledo, OH 43692.
Dragerwerk, AG,D-24 Luebeck 1, Postfach 1339, Germany.
Eastern Safety Equipment Co, 45-17 Pearson St, Long Island City, NY 11101.
Empire Abrasive Equipment Corp, 9990 Gantry Road, Philadelpha, PA 19115.
Encon Manufacturing Co, 4914 Dickson St, Houston, TX 77007.
Fiber-Metal, PO Box 248, Concordville, PA 19331.
Glendale Optical Co, 130 Crossways Park Drive, Woodbury, NY 11797.
Globe Safety Products, Inc, 125 Sunrise Place, Dayton, OH 45407.
Kelco Sales & Engineering Co, PO Box 422, Norwalk, CA 90650.
Key Houston, Inc, 13911 Atlanta Blvd, Jacksonville, FL 32225.
Lear Siegler, Inc, 714 North Brookhurst St, Anaheim, CA 92803.
Mine Safety Appliances Co, 400 Penn Center Blvd, Pittsburgh, PA 15235.
Northcott Products Co, 1826 W. Diversey Parkway, Chicago, IL 60614.
Norton Safety Products, 2000 Plainfield Pike, Cranston, RI 02920.
Pauli & Griffin, 137 Utah Ave, South San Francisco, CA 94080.
Pulmosan Safety Equipment Corp, 30-48 Linden Place, Flushing, NY 11354.
Robertshaw Controls Co, 333 North Euclid Way, Anaheim, CA 92803.
Safe-Tex, Toronto, Ontario, Canada.
Schmidt Manufacturing Inc, Houston, TX.
Scott Aviation, Divison of ATO, Inc, Lancaster, NY 14086.
Sellstrom Manufacturing Co, 59 E. Van Buren St, Chicago, IL 60605.
Siebe Gorman, Ltd, Chessington Surrey, England.
Stewart-Warner, Chicago, IL.
SurvivAir, Division of US Divers Co, 3323 W. Warner Ave, Santa Ana, CA 92702.
Titan Abrasive Systems, Inc, PO Box 3, Furlong, PA 18925.
3M Co, 3M Center, St Paul, MN 55101.
US Safety Service, Parmelee Industries, Inc, PO Box 1237, Kansas City, MO 64141.
Willson Products Division, ESB Inc, PO Box 622, Reading, PA 19603.

APPENDIX F

CROSS-REFERENCE INDEX

TB MED 502	29 CFR 1910.94	29 CFR 1910.134	CFR	ANSI STD
1-4*a*		(b) (11)	30 CFR 1	
1-4*e*				Z88.2-1980
1-4*i*			30 CFR 11.3(t)	
1-4*l*	(9) (vi)			
1-4*o*				Z88.1-1969
2-1*d*		(a)(2) & (b)(11)		
2-1*e*		(a)(3)		
2-2		(b)		
2-3		(e)(1) & (e)(3)		
2-3		(c) & (e)(2)		Z88.2-1980
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2-6*c*(2)*(b)*		(e)(3)(ii)		
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2-6*c*(3)*(e)*		(d)(2)(ii)		
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2-7*b*		(e)(5)(i)		
2-7*b*(2)		(e)(5) & (e)(5)(i)		
2-7*b*(3)		(e)(5)(i) & (e)(5)(ii)		Z87.1-1979 Z88.2-1980
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Appendix B			30 CFR 11	Z88.2-1980
Appendix C		(g)		
Appendix D			30 CFR 11.2	

The proponent agency of this bulletin is the Office of The Surgeon General. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to HQDA (DASG-PSP), WASH DC 20310.

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