

4123:1-5-17 Personal protective equipment.

(A) Reserved.

(B) Reserved.

(C) Specific requirements of general application.

(1) Personal protective equipment furnished by the employer shall be issued to the employee in sanitary and proper condition so that it will effectively protect against the hazard involved.

(2) Where employees provide their own protective equipment, such equipment shall give equal or greater protection than that furnished by the employer.

(D) Eye and face protection.

(1) Responsibility.

The employer shall provide eye protection for all employees engaged in the operations listed in paragraph (D)(2) of this rule and exposed to an eye hazard. Eye protection shall also be provided for any other employees in the immediate area and who are exposed to the hazards of the operations listed. It shall be the responsibility of the employee to use the eye protection provided by the employer (see appendix to this rule for eye and face protector selection guide).

(2) Operations requiring eye protection.

(a) Eye protection shall be provided to employees performing the following operations:

(i) When using hand tools or mechanical equipment to cut, chip, drill, clean, buff, grind, polish, shape, or surface masonry, brick, concrete, plaster, stone, plastics, or other hardened substances. This also covers demolition work where the material listed are part of the operation;

(ii) Where acids, sand, or shot blast are used in building cleaning operations;

(iii) Welding, brazing, soldering, or cutting operations involving the use of gas flames or electric arc. (See appendix to this rule);

(iv) Where portland cement is taken from an elevated bin, hopper or similar structure by a chute;

(v) All spray paint operations where the operator's eyes are exposed to paint mist in the atmosphere;

(vi) All sand or shot blast operations where the operator's eyes are exposed to the blasting;

- (vii) The opening or closing of the tap holes of cupolas or melting furnaces;
- (viii) In the handling of molten metal, molten glass, and molten plastic;
- (ix) Metal and plastic chipping, cutting, cleaning, grinding, conditioning, or machining where there is danger of flying particles;
- (x) Dressing grinding wheels;
- (xi) Cleaning operations where wire wheels are used;
- (xii) In handling injurious acids, alkalis, or other chemicals;
- (xiii) Cutting, drilling, turning, planing, jointing, and sanding of wood with power tools;
- (xiv) Operation of portable powder-actuated, pneumatically powered, and other powered fastening tools;
- (xv) Operations requiring the use of compressed air;
- (xvi) When working in close proximity to a laser beam in excess of five milliwatts;
- (xvii) Pruning trees or cutting underbrush.

(b) This rule does not apply where a shield or exhaust equipment provides adequate eye protection for employees otherwise exposed to the hazards covered in paragraphs (D)(2)(a)(i) to (D)(2)(a)(xvii) of this rule.

(3) Face shields.

(a) Face shields may be provided in lieu of other forms of eye protection if they provide the required protection against the particular hazards for which they are designed.

(b) Face shields, in addition to eye protection, shall be provided where danger to the face exists, such as in the following operations:

- (i) Welding operations;
- (ii) All sand or shot blast operations;
- (iii) Cleaning operations where wire wheels are used;
- (iv) Metal and plastic chipping, cutting, cleaning, grinding, conditioning, or machining where there is danger of flying particles;
- (v) The handling of molten metal, molten glass, and molten plastic;

(vi) The handling of injurious acids, alkalis, or other chemicals.

(4) Material requirements for eye protection.

(a) Impact test.

The lens shall withstand a one-inch diameter steel ball (weight approximately 2.4 ounces) dropped in free fall from a height of fifty inches onto the horizontal upper surface of the lens, impinging the lens within a circular area of five-eighths-inch diameter centered at the lens' mechanical center.

(b) Penetration resistance test – plastic only.

A plastic lens shall withstand a pointed projectile of suitable size, consisting of a new Singer number 25, size 135×7 needle, fastened into a holder weighing approximately 1.56 ounces freely dropped, pointed downward, from a height of fifty inches onto the outer surface of the lens. The projectile may be guided but not restricted in its fall by being dropped through a tube extending to within four inches of the lens.

(c) Frames, flammability test.

A section at least one inch long of the plastic components of the frame shall be exposed to a test for determining the flame-propagation rate. For this purpose the frame components (eyewire, temples, and sideshields) shall be ignited individually by holding one end of the specimen horizontally at the top of a luminous three-quarter-inch Bunson burner flame in a draft-free room. The rate of propagation determined by a stopwatch shall be no less than twenty-four seconds per inch. A faster rate of propagation shall be cause for rejection.

(d) Marking.

(i) Eye and face protection shall be distinctly marked in a permanent, legible manner with the manufacturer's trademark.

(ii) Each filter lens shall be marked with the shade designation. Each glass filter lens shall be marked with the letter "H" to indicate treatment for impact resistance.

(5) Laser protection.

(a) The employer shall provide laser safety goggles which will protect the employee from direct or reflected laser light equal to or greater than 0.005 watts (five milliwatts). The laser safety goggles shall provide protection for the specific wavelength of the laser and be of optical density (O.D.) adequate for the energy involved. The appendix to this rule lists the maximum power or energy density for which adequate protection is afforded by glasses of optical densities from five through eight. Output levels falling between lines in table shall require the higher density.

(b) Labeling of eye protection.

All protective goggles shall bear a label identifying the following data:

- (i) The laser wavelengths for which use is intended;
- (ii) The optical density of those wavelengths;
- (iii) The visible light transmission.

(E) Foot (toe) protection.

Foot protection shall be made available by the employer and shall be worn by the employee where an employee is exposed to machinery or equipment that presents a foot hazard or where an employee is handling material which presents a foot hazard.

(F) Respiratory protection.

(1) Where there are air contaminants as defined in rule 4123:1-5-01 of the Administrative Code, the employer shall provide respiratory equipment approved for the hazard. It shall be the responsibility of the employee to use the respirator or respiratory equipment provided by the employer, guard it against damage and report any malfunction to the employer. Note: See appendix to this rule for basic guides for the selection of respirators.

(2) This requirement does not apply where an effective exhaust system (see rules 4123:1-5-18 and 4123:1-5-992 of the Administrative Code) or where other means of equal or greater protection have been provided.

(G) Head and hair protection.

(1) Responsibility.

(a) Employer.

(i) Whenever employees are required to be present where the potential hazards to their head exists from falling or flying objects, or from physical contact with rigid objects, or from exposures where there is a risk of injury from electric shock, employers shall provide employees with suitable protective headgear.

(ii) When head protection is required employers shall provide accessories designed for use with the headgear.

(iii) Damaged parts of protective headgear shall be replaced. Protective helmets and bump caps or parts thereof and hair enclosures shall be sanitized before reissue.

(b) Employees.

Employees shall not alter any head or hair protective equipment and shall use such equipment in accordance with instructions and training received.

(2) Protective helmets.

(a) Classes of helmets.

(i) Protective helmets as defined in paragraph (B) of rule 4123:1-5-01 of the Administrative Code shall be of the following classes:

(a) Class A – limited voltage protection.

(b) Class B – high voltage protection.

(c) Class C – no voltage.

(d) Class D – limited voltage protection. Firefighters' service helmets with full brim only.

(ii) Class C or any metallic helmet shall not be provided by employers or used by employees except where the other classes would be deteriorated by exposure to chemical action and provided there is no danger of contact with electrical current.

(b) Winter liners and chin straps.

(i) All winter liners shall be fabricated of materials that will not support combustion.

(ii) Winter liners and chin straps used in conjunction with class B helmets for protection from electricity shall not contain any metallic or other conductive material.

(c) Physical requirement for helmets.

(i) Impact resistance.

Helmets shall be capable of withstanding the impact of an eight-pound steel ball, approximately three and three-quarters inches in diameter, dropped onto a center of the top of the helmet from a height of five feet without transmitting an average force of more than eight hundred fifty pounds.

(ii) Crown strap clearance.

Crown straps shall not allow the distance between the top of the head and the underside of the helmet to be adjusted to less than one inch when a twenty-five-pound weight is placed on top of the helmet. Unless the manufacturer of that particular helmet specifies otherwise.

(iii) Penetration resistance.

Class A, B, and D helmets shall not be pierced more than three-eighths inch and class C helmets not more than seven-sixteenths inch, including the thickness of the shell material, when subjected to a one-pound steel plum bob with a point having an included angle of 35+1 degrees and a maximum point radius of 0.010 inch, dropped ten feet vertically onto the top of the helmet.

(iv) Insulation resistance.

Class A and D helmets shall be capable of withstanding two thousand two hundred volts alternating-current sixty hertz (rms) for one minute, with leakage current not in excess of three milliamperes. This test is not applicable to Class C helmets. Class B helmets shall be capable of withstanding twenty thousand volts alternating-current sixty hertz for three minutes with leakage current not in excess of nine milliamperes.

(v) Helmet shell materials.

(a) Materials used in class A and class B helmets shall be water resistant and slow burning. Materials in class D helmets shall be fire resistant (self-extinguishing) and nonconductors of electricity.

(b) Class B headgear shall not have any holes of any sort in the shell nor shall it have any metal parts.

(d) Bump caps.

Bump caps or hats shall never be used as a substitute for safety helmets where there is danger from falling objects, flying particles, or electric shock.

(e) Hair enclosures.

(i) A hat, cap or net shall be provided where there is danger of hair entanglement in moving parts of machinery or equipment, or where there is exposure to means of ignition. It shall be designed to enclose all loose hair and be adjustable to accommodate all head sizes. Material used for a hair enclosure shall be durable, fast-dyed, nonirritating to the skin, and capable of withstanding frequent cleaning. It shall not be reissued from one employee to another unless it has been thoroughly sanitized.

(ii) Hair enclosures used in areas where there is exposure to sparks, hot or molten metals, or ignition from heat, flames, or chemical reaction shall be made of materials that are non-burning or flame retardant and do not melt.

(H) Hearing protection.

Employees exposed to continuous noise levels of ninety or more decibels (dBA) slow response shall be provided with approved ear protection. (If variations in noise level involve maxima at intervals of one second or less, the noise is considered continuous.) If ear plugs that require fitting are provided, they shall be fitted to the individual employees by a competent person.

(I) Protection of the body and exposed parts and other protective equipment.

(1) All persons required to work in such a manner that their clothing may become wet with acids caustics or other injurious liquids shall be provided with such gloves, aprons, coats, jackets, sleeves, or other garments made of rubber, or other materials impervious to such liquids as are required to keep their clothing dry. Aprons shall extend well below the top of boots to prevent such liquid from splashing into the boots. Provision of dry clean cotton clothing along with rubber shoes or short boots and an apron impervious to such liquids shall be considered a satisfactory substitute where small parts are cleaned, plated, or acid-dipped in open tanks and rapid work is required.

(2) Facilities for quick drenching or flushing of the eyes and body shall be provided within the work area, where employees are exposed to injurious corrosive materials. Where plumbing is not available and where storage batteries of the enclosed type with explosion-proof vents are serviced exclusively, portable, self-contained eyewash equipment may be provided in lieu of the quick drenching or flushing facilities. Where portable self-contained eyewash equipment is used in lieu of drenching or flushing facilities, it shall be capable of delivering to the eye no less than 1.5 liters (0.4 gallons) per minute for a minimum of fifteen minutes.

(3) Welding, cutting, brazing, and molten metal exposures.

All employees exposed to the hazards created by welding, cutting, brazing, or molten metal operations shall be protected by protective clothing. This includes:

(a) Flameproof gauntlet gloves.

(b) Flameproof aprons made of leather, or other material which provides equivalent protection.

(c) Exterior clothing made of wool, cotton, or other material chemically treated to reduce combustibility.

(d) Capes or shoulder covers made of leather or other material which provides equivalent protection.

(e) Protection for the ears from the overhead welding and cutting or welding and cutting in extremely confined spaces.

(4) Working by hand on energized circuits.

When an employee is required to work on, or in proximity to, energized lines, the employer shall provide and the employee shall use protective equipment approved for the hazard involved.

(5) Climbers.

(a) Where employees are required to climb poles or trees, the employer shall provide climbers, the gaffs (spurs) of which shall not be less than one and one-eighth inches in length, measured on the underside.

(b) Storage.

Storage facilities shall be provided so that the sharp points of the climber gaffs will not cause damage to other equipment or cause injury to employees.

(6) Safety belts, safety harnesses, safety straps, lifelines, and lanyards.

(a) When required, lifelines shall be securely fastened to the structure. Safety belts, safety harnesses, safety straps, lifelines and lanyards shall be used only for employee safeguarding and shall sustain a static load of no less than five thousand four hundred pounds. Any safety belts, safety harness, safety strap, lifeline, or lanyard actually subjected to in-service loading, as distinguished from static load testing, shall be removed from service and shall not be used again for employee safeguarding.

(b) Where the lifeline may be subjected to cutting or abrasion, a minimum seven-eighths-inch wire core manila rope, or equivalent, shall be provided. For all other lifeline applications, a minimum of three-fourths-inch manila rope, or equivalent, shall be provided.

(c) Safety belt, harness, or strap lanyards shall be a minimum of one-half inch nylon, or equivalent, with a maximum length to provide for a fall of no more than six feet.

(d) All safety belt, harness, or strap and lanyard hardware shall be drop-forged or pressed steel, cadmium plated. Surface shall be smooth and free from sharp edges.

(e) All safety belt, harness, or strap and lanyard hardware shall be capable of withstanding a tensile loading of four thousand pounds without cracking, breaking, or becoming permanently deformed.

(7) Safety nets.

(a) Safety nets shall be provided when workplaces are more than twenty-five feet above the ground, water, or other surface where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical.

(b) Where safety net protection is required by this rule, operations shall not be undertaken until the net is in place and has been tested.

(c) Nets shall extend eight feet beyond the edge of the work surface where employees are exposed to falling and shall be installed as closed under the work surface as practical but in no case more than twenty-five feet below such work surface with the exception of bridge construction where only one level of nets is required. Nets shall be hung with sufficient clearance to prevent the falling employees' contact with the surface or structures below. Such clearance shall be determined by impact load testing.

(d) The mesh size of nets shall not exceed six inches. All new nets shall meet accepted performance standards of seventeen thousand five hundred foot-pounds minimum impact resistance as determined and certified by the manufacturer, and shall bear a label

of proof test. Edge ropes shall provide a minimum breaking strength of five thousand pounds.

(e) Forged steel safety hooks or shackles shall be used to fasten the net to its supports. Attachment of safety nets to the working platform is prohibited.

(f) Connections between net panels shall maintain the full strength of the net.

(8) Working over or near water.

(a) Where employees are working over or near water, and where the depth or current of the water creates a danger of drowning, the employer shall provide U. S. coast guard-approved life jackets or buoyant work vests for each employee.

(b) Ring buoys with no less than ninety feet of line attached shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed one hundred fifty feet.

(c) At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water.

(d) In cribs and cofferdams where employees are exposed to danger of falling inside of the enclosure containing water, a life raft shall be provided.

(9) Night work.

When working at night, spotlights or portable lights for emergency lighting shall be provided as needed to perform the work safely.

(10) Barriers and warning devices.

The employer shall provide barriers and effective warning devices such as flasher lights, "Men Working" signs, cones, flares, lanterns, flags and reflectors, for the protection of employees when work is performed in congested areas and where employees are exposed to traffic hazards or other working conditions where a hazard may exist.

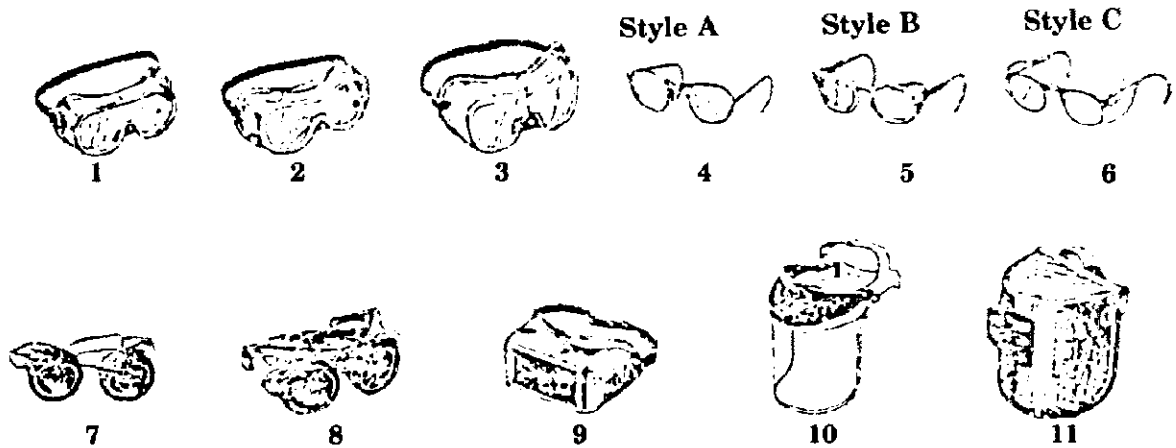
(J) Employee's responsibility.

It shall be the responsibility of the employee to properly use the equipment provided by the employer as required in this rule.

Effective Date: 4/1/99

Prior Effective Dates: 4/1/64; 8/1/77; 1/1/86

APPENDIX TO RULE 4123: 1-5-17
EYE AND FACE PROTECTOR SELECTION GUIDE



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| <ul style="list-style-type: none"> 1. GOGGLES, Flexible Fitting, Regular Ventilation 2. GOGGLES, Flexible fitting, Hooded Ventilation 3. GOGGLES, Cushioned Fitting, Rigid Body *4. SPECTACLES, without Sideshields 5. SPECTALES, Eyecup Type Sideshields 6. SPECTACLES, Semi-/Flat-Fold Sideshields **7. WELDING GOGGLES, Eyecup Type, Tinted Lenses (Illustrated) | <ul style="list-style-type: none"> 7A. CHIPPING GOGGLES, Eyecup Type, Clear Safety Lenses (Not Illustrated) **8. WELDING GOGGLES, Coverspec Type, Tinted Lenses (Illustrated) 8A. CHIPPING GOGGLES, Coverspec Type, Clear Safety Lenses (Not Illustrated) **9. WELDING GOGGLES, Converspec Type, Tinted Plate Lens *10. FACE SHIELD, Plastic or Mesh Window (see caution note) *11. WELDING HELMET |
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*Non-sideshield spectacles are available for limited hazard use requiring only frontal protection.

**See "Welding and cutting shade selection guide" of this appendix.

APPLICATIONS

OPERATION	HAZARDS	PROTECTORS
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	7, 8, 9
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	2 (For severe exposure add 10)
CHIPPING	FLYING PARTICLES	1, 3, 4, 5, 6, 7A, 8A
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	11 (In combination with 4, 5, 6, in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	7, 8, 9 (For severe exposure add 10)
GRINDING-LIGHT	FLYING PARTICLES	1, 3, 5, 6 (For severe exposure add 10)
GRINDING-HEAVY	FLYING PARTICLES	1, 3, 7A, 8A (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	2 (10 when in combination with 5, 6)
MACHINING	FLYING PARTICLES	1, 3, 5, 6 (For severe exposure add 10)
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	7, 8 (10 in combination with 5, 6, in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	1, 3, 4, 5, 6 (Tinted lenses advisable; for severe exposure add 10)

CAUTION:

- Face shields alone do not provide adequate protection.
- Plastic lenses are advised for protection against molten metal splash.
- Contact lenses, of themselves, do not provide eye protection in the industrial sense and shall not be worn in a hazardous environment without appropriate covering safety eyewear.

Welding and cutting filter shade selection guide

The function of the eye protection required in paragraph (D) (2) (a) (iii) of rule 4121:1-5-17 is to protect the wearer from injurious rays and light generated by welding and cutting operations. The table which follows shall not be construed as specific requirements, but shall serve as a guide in determining the shade of filter plate desirable for a given operation. The following shades of filter plates should be used as indicated below:

Welding Operation	Shade Number*
Shielded Metal-Arc Welding, up to $\frac{5}{32}$ in (4mm) electrodes.....	10
Shielded Metal-Arc Welding, $\frac{3}{16}$ to $\frac{1}{4}$ in (4.8 to 6.4 mm) electrodes.....	12
Shielded Metal-Arc Welding, over $\frac{1}{4}$ in (6.4 mm) electrodes.....	14
Gas Metal-Arc Welding (Nonferrous).....	11
Gas Metal-Arc Welding (Ferrous).....	12
Gas Tungsten-Arc Welding.....	12
Atomic Hydrogen Welding.....	12
Carbon Arc Welding.....	14
Torch Soldering.....	2
Torch Brazing.....	3 or 4
Light Cutting up to 1 in (25 mm).....	3 or 4
Medium Cutting, 1 to 6 in (25 to 150 mm).....	4 or 5
Heavy Cutting, over 6 in (150 mm).....	5 or 6
Gas Welding (Light) up to $\frac{1}{8}$ in (3.2 mm).....	4 or 5
Gas Welding (Medium) $\frac{1}{8}$ to $\frac{1}{2}$ in (3.2 to 12.7 mm).....	5 or 6
Gas Welding (Heavy over $\frac{1}{2}$ in (12.7 mm).....	6 or 8

*The choice of a filter shade may be made on the basis of visual acuity and may, therefore, vary widely from one individual to another, particularly under different current densities, materials, and welding processes. However, the degree of protection from radiant energy afforded by the filter plate or lens when chosen to allow visual acuity will still remain in excess of the needs of eye filter protection. Filter plate shades as low as shade 8 have proven suitably radiation-absorbent for protection from the arc-welding processes.

NOTE: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the operation (spectrum).

Selecting laser safety glass

INTENSITY		ATTENUATION	
CW maximum power density (watts/cm²)	Optical density (O.D.)	Attenuation factor	
10 ⁻²	5	10 ⁵	
10 ⁻¹	6	10 ⁶	
1.0	7	10 ⁷	
10.0	8	10 ⁸	

Respirator Selection Guide

Hazard	Respirator
OXYGEN DEFICIENCY	Self-contained breathing apparatus Hose mask with blower Combination air-line respirator 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. Hose mask with blower. Air-purifying, full facepiece respirator With chemical canister (gas mask). Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator 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 without blower. Air-purifying, half-mask or mouth piece respirator with chemical cartridge.
PARTICULATE CONTAMINANTS Immediately dangerous to Life or health	Self-contained breathing apparatus Hose mask with blower. Air-purifying, full face piece respirator with appropriate filter. Self-rescue mouthpiece respirator (for escape only) Combination air-line respirator with auxiliary self-contained air supply or an air-storage air supply with alarm
Not immediately dangerous to life or health	Air-purifying, half-mask or mouth-piece respirator with filter pad or cartridge. Air-line respirator Air-line abrasive-blasting respirator. Hose mask without blower.

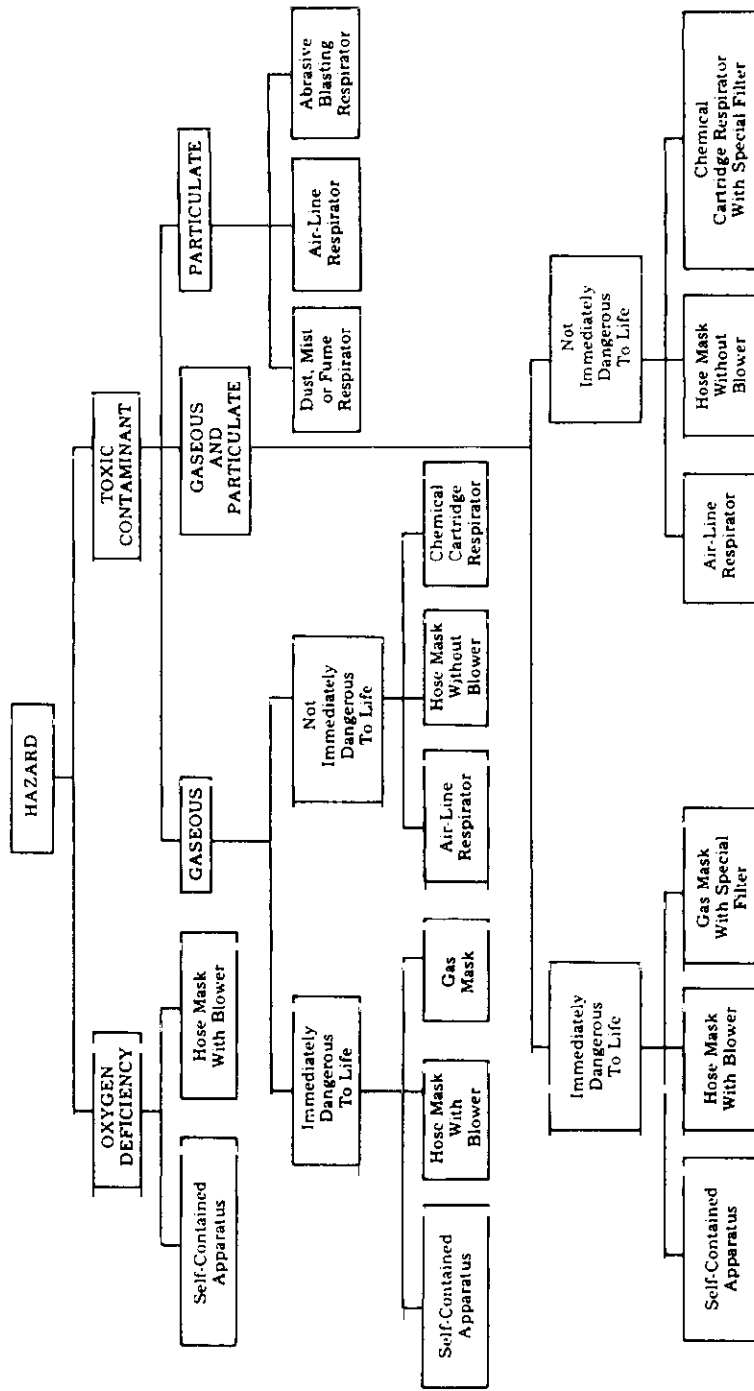
COMBINATION GAS,
VAPOR,
AND PARTICULATE
CONTAMINANTS

Immediately dangerous to
Life or health

Not immediately dangerous
to life or health

Self-contained breathing apparatus
Hose mask with blower.
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 with
auxiliary self-contained air supply or
an air-storage receiver with alarm.

Air-line respirator.
Hose mask without blower.
Air-purifying, half mask or mouth-
piece respirator with chemical
cartridge and appropriate filter



Outline for selecting respiratory protective devices.