SECTION 5

PERSONAL PROTECTIVE AND SAFETY EQUIPMENT

05.A GENERAL

05.A.01 Responsibilities.

a. Based on hazard evaluations (conducted by supervisors), employers shall select, and have each affected employee use, PPE that will protect the employee from hazards. ***> See also 06.A.02.***

b. Employers shall communicate PPE decisions to each affected employee and select PPE that properly fits each affected employee.

c. Employees shall use all PPE that may be required to maintain their exposure within acceptable limits.

d. The employer will make all reasonable efforts to accommodate employees with religious beliefs that may conflict with the PPE requirements contained within this manual. However, when reasonable efforts to accommodate the employee's religious beliefs do not provide the necessary safe working environment (without PPE), then the employer shall require the employee to use the appropriate PPE or the employee will not be allowed to work in the area where he/she will be exposed to the hazard requiring protection.

05.A.02 Employees shall be physically able and medically determined qualified to use the personal protective and safety equipment that may be required in their job duties.

05.A.03 Employers shall ensure users of personal protective and safety equipment are trained to know the following: when PPE, and what types of PPE are necessary; how to properly don, doff, adjust,

and wear PPE; limitations of the PPE; and proper care, inspection, testing, maintenance, useful life, storage, and disposal of the PPE.

a. Each affected employee shall demonstrate an understanding of this training and the ability to use PPE properly before being allowed to perform work requiring the use of PPE.

b. When the employer has reason to believe that any affected employee who has been trained does not have the understanding and skill required for the use of the PPE, the employer shall assure the employee receives the necessary retraining to acquire the appropriate skills.

c. The employer shall verify that each affected employee has received and understood the required training by a written certification that identifies the name of each employee trained, the date(s) of the training, and the subjects taught.

05.A.04 A copy of the manufacturer's use, inspection, testing, and maintenance instructions shall be maintained with the personal protective and safety equipment.

05.A.05 Personal protective and safety equipment shall be tested, inspected, and maintained in serviceable and sanitary condition as recommended by the manufacturer.

a. Defective or damaged equipment shall not be used. It shall be tagged as out of service and locked-up or immediately removed from the work site to prevent use.

b. Before being stored or reissued to another person, equipment shall be cleaned, disinfected, inspected, and repaired.

05.A.06 When employees provide their own equipment, the employer is responsible for assuring its adequacy in protecting against the hazard and its state of repair.

05.A.07 Minimum requirements.

a. Employees shall wear clothing suitable for the weather and work conditions: the minimum for fieldwork (i.e., construction sites, industrial operations and maintenance activities, emergency operations, regulatory inspections, etc.) shall be short sleeve shirt, long pants (excessively long or baggy pants are prohibited), and leather or other protective work shoes or boots.

b. Protective equipment shall be of heat/fire/chemical/electrical-resistive material when conditions require protection against such hazards.

05.A.08 Protective footwear, such as rubber boots, protective covers, ice cramp-ons, and safety-toed boots, shall be worn by all persons exposed to hazards to the feet (including, but not limited to, puncture, slipping, electrical, or chemical hazards).

a. For all activities in which USACE or contractor personnel or official visitors are potentially exposed to foot hazards, the applicable PHA/AHA, APP, or project safety and health plan shall include an analysis of, and prescribe specific protective measures to be taken for, reducing foot hazards.

b. USACE and Contractor personnel shall, as a minimum, wear safety-toed footwear meeting ANSI Z41 while working on construction sites unless it can be demonstrated by a PHA/AHA to the GDA satisfaction that a different type of foot protection is required.

c. Footwear providing protection against impact and compressive forces, conduction hazards, electrical hazards, and sole puncture shall meet the applicable requirements of ANSI Z41; footwear providing protection against impact and compression hazards shall be rated as I75 and C75.

d. Unexploded ordnance (UXO) sweep personnel shall have no metal parts in or on their footwear.

e. Personnel participating in wild land fire management activities shall wear leather lace-up boots with slip-resistant soles, such as a hard rubber lug-type or tractor tread, a top height of 8 in (20.3 cm) or more, and without steel toes. Soles should not be made of composition rubber or plastic, which have low melting points.

05.A.09 Miners' lights and flashlights used around explosives, and in atmospheres likely to contain explosive vapors, dusts, or gases shall be approved by the Mine Safety and Health Administration (MSHA) or National Institute for Occupational Safety and Health (NIOSH) for use in such locations.

05.A.10 Persons involved in activities that subject the hands to injury (e.g., cuts, abrasions, punctures, burns, chemical irritants, toxins, vibration, and forces that can restrict blood flow) shall select and use hand protection appropriate for the hazard in accordance with ANSI/International Safety Equipment Association (ISEA) 105.

05.A.11 Persons exposed to vehicular or equipment traffic, including signalpersons, spotters, or inspectors, shall wear high visibility apparel meeting ANSI/ISEA 107 Class 3 requirements.

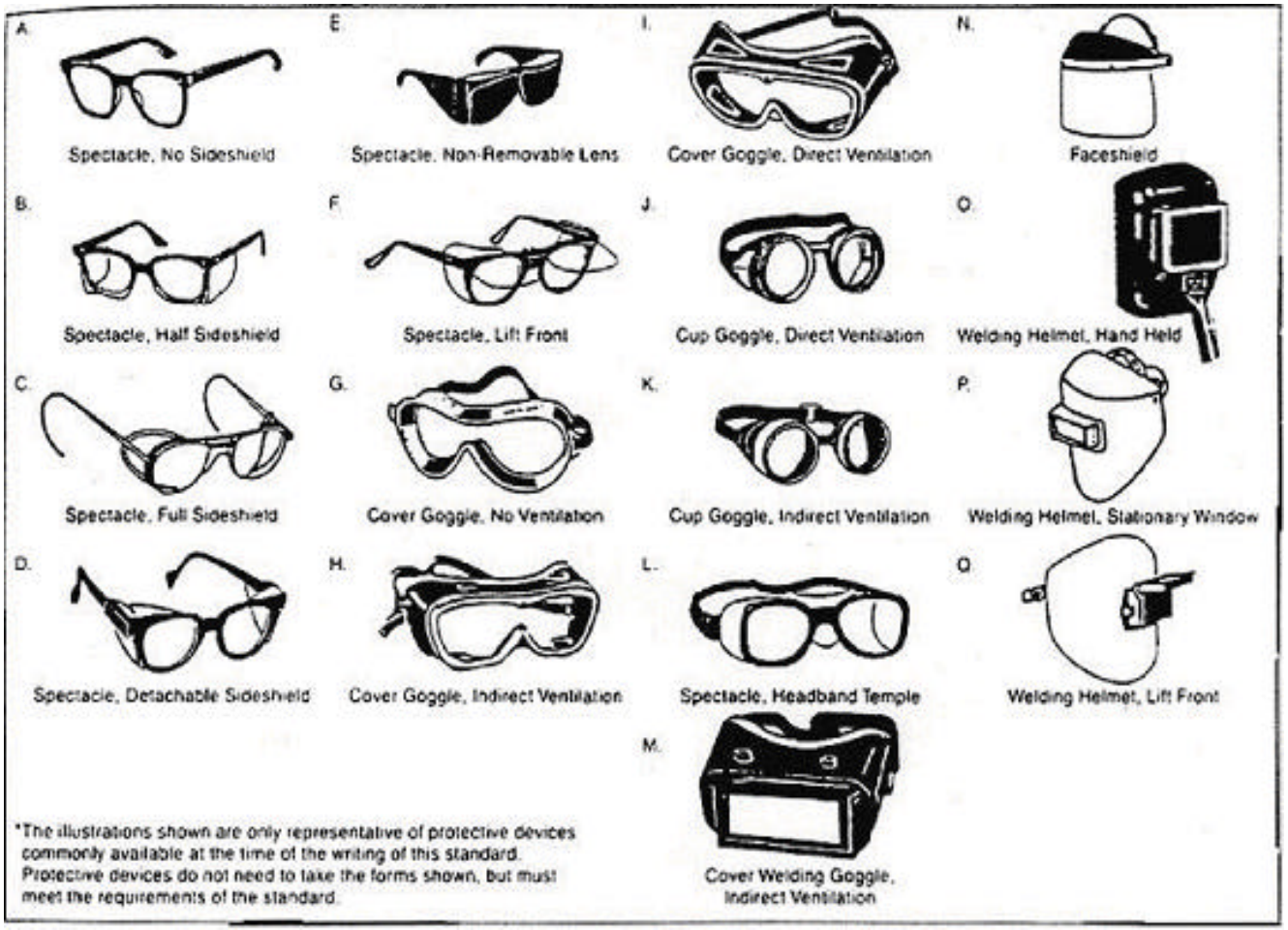
05.A12 Protective leg chaps shall be worn by workers who operate chain saws. Protective leg chaps must meet the specifications in American Society for Testing and Materials (ASTM) Standard F1897.

05.B EYE AND FACE PROTECTION

05.B.01 Persons shall be provided with eye and face protection equipment, as outlined in Table 5-1, when machines or operations present potential eye or face injury from physical, chemical, or radiation agents.

TABLE 5-1

EYE AND FACE PROTECTOR SELECTION GUIDE



NOTES:

(1) Care should be take to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards must be provided.

(2) Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.

(3) Faceshields shall only be worn over primary eye protection.

(4) Filter lenses shall meet the requirements for shade designations in Table 5-2.

(5) Persons whose vision requires the use of prescription (Rx) lenses shall wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses shall also be required to wear appropriate covering eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Refer to ANSI/ASSE Z87-1, Section 6.5, Special Purpose Lenses.

(9) Welding helmets or handshields shall be used only over primary eye protection.

(10) Non-sideshield spectacles are available for frontal protection only.

Table 5-1 (CONTINUED)

EYE AND FACE PROTECTOR SELECTION GUIDE

		ASSESSMENT See Note (1)	PROTECTOR TYPE	PROTECTORS	LIMITATIONS	NOT RECOMMENDED
I M P A C T	Chipping, grinding, machining, masonry work, riveting and sanding	Flying fragments, objects, large chips, particles, sand, dirt, etc.	B, C, D, E, F, G, H, I, J, K, L, N	Spectacles, goggles, faceshields SEE NOTES (1)(3)(5)(6)(10) For severe exposures add N	Protective devices do not provided unlimited protection. SEE NOTE (7)	Protectors that do not provide protection from side exposure SEE NOTE (10) Filter or tinted lenses that restrict light transmittance, unless it is determined that a glare hazard exists. Refer to OPTICAL RADIATION.
H E A T	Furnace operations, pouring, casting, hot dipping, gas cutting, and welding	Hot sparks	B, C, D, E, F, G, H, I, J, K, L, N	Faceshields, goggles, spectacles For severe exposure add N SEE NOTE (2)(3)	Spectacles, cup and cover type goggles do not provide unlimited facial protection SEE NOTE (2)	Protectors that do not provide protection from side exposure
		Splash from molten metals	N	Faceshields worn over goggles H, K SEE NOTE (2)(3)		
		High temperature exposure	N	Screen faceshields, reflective faceshields	SEE NOTE (3)	

Table 5-1 (CONTINUED)

EYE AND FACE PROTECTOR SELECTION GUIDE

		ASSESSMENT See Note (1)	PROTECTOR TYPE		PROTECTORS	LIMITATIONS	NOT RECOMMENDED
CHEMICAL	Acid and chemical handling, degreasing, plating	Splash	G, H, K N		For severe exposure add N	Ventilation should be adequate but protected from splash entry	Spectacles, welding helmets, handshields
		Irritating mists	G		Special purpose goggles	SEE NOTE (3)	
DUST	Woodworking, buffing, general dusty conditions	Nuisance dust	G, H, K		Goggles, eyecup and cover types	Atmospheric conditions and the restricted ventilation of the protector can cause the lenses to fog. Frequent cleaning may be required.	
OPTICAL RADIATION	WELDING: electric arc	O, P, Q	TYPICAL FILTER LENSE SHADE	PRO-TEC-TORS		Protection from optical radiation is directly related to filter lens density. SEE NOTE (4). Select the darkest shade that allows adequate task performance.	Protectors that do not provide protection from optical radiation.

a. All eye and face protection equipment shall meet the requirements of ANSI/American Society of Safety Engineers (ASSE) Z87.1 and bear a legible and permanent "Z87" logo to indicate compliance with the standard.

b. Eye and face protection equipment shall be distinctly marked to facilitate identification of the manufacturer.

c. Employees shall use eye protection providing side protection.

05.B.02 When required by this regulation to wear eye protection, persons whose vision requires the use of corrective lenses in eyeglasses shall be protected by one of the following:

a. Eyeglasses with protective lenses providing optical correction,

b. Goggles that can be worn over corrective lenses without disturbing the adjustment of the spectacles, or

c. Goggles that incorporate corrective lenses mounted behind the protective lenses.

05.B.03 Personnel who are considered blind in one eye and are working in other than administrative functions shall wear safety spectacles with side shields while on the job.

05.B.04 Operations that require the use of, or exposure to, hot or molten substances (e.g., babbitting, soldering, pouring or casting of hot metals, handling of hot tar, oils, liquids, and molten substances) shall require eye protection, such as goggles, with safety lenses and screens for side protection, or face masks, shields, and helmets giving equal protection. Lens mountings shall be able to retain in position all parts of a cracked lens.

05.B.05 Operations that require handling of harmful materials (e.g., acids, caustics, hot liquids, or creosoted materials) and

operations where protection from gases, fumes, and liquids is necessary shall require the wearing of goggles with cups of soft pliable rubber and suitable faceshields, masks, or hoods that cover the head and neck, and other protective clothing appropriate to the hazards involved.

05.B.06 Operations where protection from radiant energy with moderate reduction of visible light is necessary, including welding, cutting, brazing, and soldering, shall require eye and face protection suitable to the type of work, providing protection from all angles of direct exposure, and with lenses of the appropriate shade. ***> See Table 5-2***

05.B.07 Glare-resistant glasses that comply with ANSI Z80.3 with an ultraviolet A-region (UVA) and ultraviolet B-region (UVB) 99% filtration shall be worn when conditions require protection against glare.

05.B.08 Tinted or automatically darkening lenses should not be worn when work tasks require the employee to pass from brightly to dimly lighted areas.

05.C HEARING PROTECTION AND NOISE CONTROL

05.C.01 Sound-pressure level limits.

a. DOD personnel shall be provided protection against the effects of hazardous noise exposure whenever sound-pressure levels exceed 85 decibels A-weighed (dB(A)) steady-state expressed as a time-weighted average (TWA) or 140 dB(A) impulse.

b. Non-DOD personnel shall be provided, as a minimum, protection against the effects of hazardous noise exposure whenever the sound-pressure level exceeds the limits and/or exposure times specified in Table 5-3.

TABLE 5-2

REQUIRED SHADES FOR FILTER LENSES AND GLASSES IN WELDING, CUTTING, BRAZING, AND SOLDERING

OPERATION	SHADE NUMBER
Soldering	2
Torch Brazing	3 or 4
Cutting (light) up to 1 in (2.5 cm)	3 or 4
Cutting (medium) 1 to 6 in (2.5 to 15.2 cm)	4 or 5
Cutting (heavy) 6 in (15.2 cm) or more	5 or 6
Gas welding (light) up to 1/8 in (0.3 cm)	4 or 5
Gas welding (medium) 1/8 to 1/2 in (0.3 to 1.2 cm)	5 or 6
Gas welding (heavy) 1/2 in (1.2 cm) or more	6 or 8
Atomic hydrogen welding	10 – 14
Inert-gas metal-arc welding (nonferrous) - 1/16 to 5/32 in (0.1 to 0.4 cm) electrodes	11
Inert-gas metal-arc welding (ferrous) - 1/16 to 5/32 in (0.1 to 0.4 cm) electrodes	12
Shielded metal-arc welding - 1/16 to 5/32 in (0.1 to 0.4 cm) electrodes	10
Shielded metal-arc welding - 3/16 to 1/4 in (0.4 to 0.6 cm) electrodes	12
Shielded metal-arc welding - 5/16 to 3/8 in (0.7 to 0.9 cm) electrodes	14
Carbon arc welding	14

05.C.02 When personnel are subjected to sound-pressure levels exceeding the limits specified in Table 5-3, feasible engineering or administrative controls shall be used. When such controls fail to reduce sound-pressure levels within the specified limit, PPE shall be selected, evaluated, provided, and used in accordance with the hearing conservation program. Hearing protection provided must be capable of attenuating worker noise exposure below an 8-hour TWA of 85 dB(A). In cases where hearing protection devices do not provide sufficient attenuation to reduce the worker noise exposure level below 85 dB(A), administrative control of exposure will be necessary. In determining the attenuation value of a given hearing protector, subtract 7 dB(A) from the Noise Reduction Rating (NRR). This corrected NRR can then be subtracted from the individual worker's noise environment in order to assess the adequacy of the protector, or see Appendix A to 29 CFR 1910.95.

TABLE 5-3

PERMISSIBLE NON-DoD NOISE EXPOSURES

Duration/day (hours)	Sound-pressure level dB(A) slow response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4	115

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, the combined effects should be considered rather than the individual effect of each. Exposure to

different levels for various periods of time shall be computed according to the following formula:

$$C_n = T_1 /L_1 + T_2 /L_2 + ... + T_3 /L_3$$

Where :

C = combined noise exposure factor,

T = the total time of exposure at a specified sound-pressure level (in hours), and

L = the total time of exposure permitted at that level (in hours), from Table 5-3.

If C_n > = 1, hearing protection is required.

05.C.03 Whenever sound-pressure levels equal or exceed 85 dB(A) (measured as an 8-hour TWA), a continuing, effective hearing conservation program shall be administered in accordance with 29 CFR 1910.95: for DOD personnel the hearing conservation program shall conform to DODI 6055.12 and AR 40-5.

05.C.04 When sound-pressure levels exceed 115 dB(A) steady-state, personal ear protection equivalent to the combination of earplugs and earmuffs shall be required.

05.C.05 Sound-pressure level measurements shall be made by qualified personnel using calibrated instruments.

05.C.06 Ear insert devices to include disposable, preformed, or custom molded earplugs shall be fitted to the exposed individual by an individual trained in such fitting and able to recognize the difference between a good and a poor fit: plain cotton is not an acceptable protective device.

05.C.07 Noise hazard areas (areas in which sound-pressure levels exceed the limits specified in 05.C.01) shall be marked with caution

signs indicating both the presence of hazardous noise levels and the requirement for hearing protection.

05.D HEAD PROTECTION

05.D.01 All persons working in or visiting hard-hat areas shall be provided with and required to wear Type I or Type II, Class G (General - low voltage electrical protection) or Class E (Electrical – high voltage electrical protection) headgear. For emergency response operations and other activities with greater need for side impact protection, Type II head protection is recommended. ***>See Appendix B.***

a. Hard-hat areas are those areas with potential hazard of head injury: all construction areas are considered hard-hat areas. The identification and analysis of head hazards will be documented in an AHA, APP, or project safety and health plan, as appropriate.

b. Hard-hat areas shall be general areas (such as dredging, construction, alteration, demolition, quarry, or similar field activities) rather than specific portions of a building or project.

c. All points of entry to a hard-hat area shall have a sign warning of the requirement to wear hard hats.

05.D.02 All protective headgear shall meet the requirements of the current ANSI Z89.1.

a. No modification to the shell or suspension is allowed unless approved by the manufacturer.

b. Hard hats shall be worn with the bill facing forward.

c. Protective headgear worn near electric lines and equipment shall be Class E.

d. No ball caps, knit caps, or other headdress shall be worn under the hard hat that could interfere with the fit or stability of the hard hat unless approved by the manufacturer.

05.D.03 Protective headgear and components shall be visually inspected on a daily basis for signs of damage (dents, cracks, etc.) that might reduce the degree of safety originally provided. Headgear will periodically be inspected for ultraviolet degradation as evidenced by cracking or flaking of the helmet.

05.D.04 Drilling holes or in any way changing the integrity of the hard hat is prohibited.

05.D.05 Protective headgear worn by USACE employees shall (in addition to complying with the preceding specifications) be:

a. White in color and marked with a 1-in (2.5-cm) band of red reflective material placed along the base of the crown with a 5 in (12.7 cm) break in front. A red Corps of Engineers castle insignia, meeting specifications of Engineering Regulation (ER) 385-1-6, will be centered at the front of the hat with the base of the insignia approximately 3/4 in (1.9 cm) above the base of the crown. Personnel may place their name above the insignia and their organization title below the insignia: the rank of military personnel should precede their name. An American Flag insignia may be worn on the back of the hard hat.

b. Local use of the sides of hard hats for safety decals is authorized.

c. Alterations that will reduce the dielectric or impact strength will not be made.

d. Requests for variations in color and marking to accommodate occupational specialties should be submitted for consideration to HQUSACE Safety and Health Office.

e. Chin straps will be worn when wearers are subject to high wind conditions and/or working on elevated structures

05.E RESPIRATORY PROTECTION

05.E.01 General. Respirators applicable and suitable for the purpose intended shall be provided and worn by Government in-house and Contractor employees performing work activities to include those covered by OSHA's General Industry, Shipyard, and Construction standards when such equipment is necessary to protect the health of employees. Respirators, training, and medical evaluations shall be provided at no cost to the employee.

O5.E.02 Respiratory Hazard Assessment. A hazard assessment shall be conducted and documented in accordance with Section 06 to identify and evaluate respiratory hazards, such as harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors. This evaluation shall include a reasonable estimate of employee exposure and an identification of the contaminant's chemical state and physical form. The control of such hazards, as far as feasible, shall be by accepted engineering control (e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials) and improved work practices. When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be provided by the employer and used by employees.

05.E.03 Written respiratory protection program. Where respirators are necessary to protect the health of the employee, establish and implement a written respiratory protection program with worksite-specific procedures in accordance with this section and OSHA's respiratory protection standard at 29 CFR 1910.134. Designate a competent person as program administrator, who is qualified by appropriate training or experience that is commensurate with the complexity of the program, to administer and oversee the respiratory protection program and conduct the required evaluations of program effectiveness. The program shall be updated as necessary to reflect those changes in workplace

conditions that affect respirator use. Include in the program the following provisions:

a. Procedures for selecting respirators for use in the workplace;

b. Medical evaluations of employees required to use respirators;

c. Fit testing procedures for tight-fitting respirators;

d. Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

e. Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

f. Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

g. Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

h. Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

i. Procedures for regularly evaluating the effectiveness of the program.

05.E.04 Voluntary Use. Where respirator use is not required:

a. Respirators may be provided at the request of employees or employees may be permitted to use their own respirators, if it is determined that such respirator use will not in itself create a hazard. If it is determined that any voluntary respirator use is permissible, provide the respirator users with the information

contained in the OSHA respirator standard in Appendix D of 29 CFR 1910.134, and

b. Establish and implement those elements of the written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Employees are not required to be included in the written respiratory protection program where it is determined the only use of respirators involves the voluntary use of filtering facepieces (dust masks).

05.E.05 Selection - General. Select and provide an appropriate respirator based on the respiratory hazard(s) to which the employee is exposed and workplace and user factors that affect respirator performance and reliability.

a. Select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification. Selection and use of commercially available respirators for protection against military chemical agents must be those approved for use in accordance with the DOD and Army requirements to include AR 11-34.

b. Identify and evaluate the respiratory hazard(s) in the workplace in accordance with 05.E.02. Where the actual or reasonable estimate of employee exposure cannot be determined, consider the atmosphere to be immediately dangerous to life and health (IDLH).

c. Select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

05.E.06 Selection - Respirators for IDLH atmospheres. Provide the following respirators for employee use in IDLH atmospheres:

a. A full-facepiece, pressure-demand, self-contained breathing apparatus (SCBA) certified by NIOSH for a minimum service life of 30 minutes; or

b. A combination full-facepiece, pressure-demand, supplied-air respirator (SAR) with auxiliary self-contained air supply.

c. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

d. All oxygen-deficient atmospheres shall be considered IDLH. Exception: If it can be demonstrated that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of 29 CFR 1910.134 for the altitudes set out in the table, then any atmosphere-supplying respirator may be used.

05.E.07 Selection - Respirators for atmospheres that are not IDLH. Provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA requirements under routine and reasonably foreseeable emergency situations.

a. Use assigned protection factors (APFs) described in OSHA specific standards, most current edition of the NIOSH Respirator Decision Logic, ANSI Z88.2, or other nationally recognized sources.

b. Provide a respirator appropriate for the chemical state and physical form of the contaminant.

c. For protection against gases and vapors, provide:

(1) An atmosphere-supplying respirator, or

(2) An air-purifying respirator, provided that the respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or if there is no ESLI

appropriate for conditions in the workplace, implement a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. Describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

d. For protection against particulates, provide:

(1) An atmosphere-supplying respirator, or

(2) An air-purifying respirator equipped with a filter certified for particulates by NIOSH.

05.E.08 Medical evaluation. Provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. Exception: A medical evaluation is not required for employees whose only respirator use would be the use of a NIOSH certified Emergency Life Support Apparatus (ELSA) escape only respirator that provides less than 30 minutes of breathing air and is used to escape from a building/structure in the event of an emergency. An employee's medical evaluations may be discontinued when the employee is no longer required to use a respirator. Implement the following medical evaluation procedures:

a. Identify a physician or other licensed healthcare professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire. The medical evaluation shall obtain the information requested by the questionnaire in 29 CFR 1910.134, Appendix C, Part A, Sections 1 and 2.

b. Ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in 29 CFR 1910.134, Appendix C,

Part A, Section 2, or whose initial medical examination demonstrates the need for a follow-up medical examination. The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

c. The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

d. Provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

e. The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

(1) The type and weight of the respirator to be used by the employee;

(2) The duration and frequency of respirator use (including use for rescue and escape);

(3) The expected physical work effort;

(4) Additional protective clothing and equipment to be worn; and

(5) Temperature and humidity extremes that may be encountered.

f. Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

g. Provide the PLHCP with a copy of the written respiratory protection program and a copy of the OSHA respiratory protection standard, 29 CFR 1910.134.

h. When a PLHCP is replaced, ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. Employees do not have to be medically reevaluated solely because a new PLHCP has been selected.

i. Medical determination. In determining the employee's ability to use a respirator, obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(1) Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(2) The need, if any, for follow-up medical evaluations; and

(3) A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

j. If the respirator is a negative-pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, provide a powered-air purifying respirator (PAPR). If a subsequent medical evaluation finds that the employee is medically able to use a negative-pressure respirator, then there is no continuing requirement to provide the employee a PAPR.

k. At a minimum, provide additional medical evaluations that comply with the requirements of the OSHA respirator standard at 29 CFR 1910.134 if:

(1) An employee reports medical signs or symptoms that are related to ability to use a respirator;

(2) A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(3) Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or

(4) A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

05.E.09 Fit testing.

a. Ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) required by this paragraph.

b. Ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

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

d. If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable

opportunity to select a different respirator facepiece and to be retested.

e. The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in the OSHA respirator standard at 29 CFR 1910.134, Appendix A.

f. QLFT may only be used to fit test negative-pressure, air-purifying respirators that must achieve a fit factor of 100 or less.

g. If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

h. Fit testing of tight-fitting, atmosphere-supplying respirators and tight-fitting, PAPRs shall be accomplished by performing quantitative or qualitative fit testing in the negative-pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(1) QLFT of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative-pressure respirator with appropriate filters, or by using an identical negative-pressure, air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or PAPR facepiece.

(2) QNFT of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(3) Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece shall be restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

05.E.10 Use of respirators. Establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

a. Facepiece seal protection. Do not permit respirators with tight-fitting facepieces to be worn by employees who have:

(1) Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(2) Any condition that interferes with the face-to-facepiece seal or valve function.

(3) If an employee wears corrective glasses or goggles or other PPE, ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(4) For all tight-fitting respirators, ensure that employees perform a user seal check each time they put on the respirator using the procedures in 29 CFR 1910.134, Appendix B-1, or procedures recommended by the respirator manufacturer that can be demonstrated to be as effective as those in Appendix B-1.

b. Continuing respirator effectiveness. Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work

area conditions or degree of employee exposure or stress that may affect respirator effectiveness, reevaluate the continued effectiveness of the respirator. Ensure that employees leave the respirator use area:

(1) To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(2) If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece. (If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, replace or repair the respirator before allowing the employee to return to the work area); or

(3) To replace the respirator or the filter, cartridge, or canister elements.

c. Procedures for IDLH atmospheres. For all IDLH atmospheres, ensure that:

(1) One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(2) Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(3) The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(4) A designated competent person responsible for work activities in the IDLH atmosphere is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(5) The designated competent person, once notified, provides necessary assistance appropriate to the situation;

(6) Employee(s) located outside the IDLH atmospheres are equipped with pressure-demand or other positive-pressure SCBAs, or a pressure-demand or other positive-pressure, supplied-air respirator with auxiliary SCBA; and either appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or equivalent means for rescue where retrieval equipment is not required.

d. Procedures for interior structural firefighting. In addition to the requirements set forth under 5.E.10.c, in interior structural fires, ensure that:

(1) At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(2) At least two employees are located outside the IDLH atmosphere; and

(3) All employees engaged in interior structural firefighting use SCBAs.

(4) One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

(5) Firefighters may perform emergency rescue activities before an entire team has assembled.

5.E.11 Maintenance and care of respirators. Provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

a. Cleaning and disinfecting. Provide each respirator user with a respirator that is clean, sanitary, and in good working order. Ensure that respirators are cleaned and disinfected using the procedures in 29 CFR 1910.134, Appendix B-2, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(1) Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(2) Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(3) Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(4) Respirators used in fit testing and training shall be cleaned and disinfected after each use.

b. Storage. Ensure that respirators are stored as follows:

(1) All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals; and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(2) In addition, emergency respirators shall be:

(a) Kept accessible to the work area;

(b) Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(c) Stored in accordance with any applicable manufacturer's instructions.

c. Inspection. Ensure that respirators are inspected as follows:

(1) All respirators used in routine situations shall be inspected before each use and during cleaning;

(2) All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and

(3) Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(4) Ensure that respirator inspections include the following:

(a) A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece; head straps; valves; connecting tube; and cartridges, canisters, or filters; and

(b) A check of elastomeric parts for pliability and signs of deterioration.

(c) In addition, SCBA shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. Determine that the regulator and warning devices function properly.

(5) For respirators maintained for emergency use:

(a) Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and

(b) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

d. Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service and are discarded or repaired or adjusted in accordance with the following procedures:

(1) Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and only the respirator manufacturer's NIOSH-approved parts designed for the respirator shall be used;

(2) Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(3) Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

05.E.12 Breathing air quality and use. Provide employees using atmosphere-supplying respirators (SAR and SCBA) with breathing gases of high purity.

a. Ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration are in accordance with the following specifications:

(1) Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

(2) Compressed breathing air shall meet at least the requirements for Grade D breathing air described in Compressed Gas Association (CGA) G-7.1, to include:

(a) Oxygen content (v/v) of 19.5-23.5%;

(b) Hydrocarbon (condensed) content of 5 milligrams per cubic meter (mg/m^3) of air or less;

(c) Carbon monoxide (CO) content of 10 parts per million (ppm) or less;

(d) Carbon dioxide (CO_2) content of 1,000 ppm or less; and

(e) Lack of noticeable odor.

(3) OSHA does not require the use of a specific instrument to verify the compliance of air quality requirements prescribed in CGA G-7.1. Any measuring instrument that has an accuracy of + or - 25% at a 95% confidence limit is acceptable.

b. The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

c. The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

d. The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(1) Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (DOT) (49 CFR 173 and 49 CFR 178);

(2) Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(3) The moisture content in the cylinder does not exceed a dew point of -50 degrees Fahrenheit (°F) (-45.6 degrees Celsius (°C)) at 1 atmosphere pressure.

e. Ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(1) Prevent entry of contaminated air into the air-supply system;

(2) Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 °F (5.56 °C) below the ambient temperature;

(3) Have suitable in-line, air-purifying, sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions. Since the breathing air system and the frequency of use vary among different users, there is no single testing frequency of air quality that will be satisfactory for all users. When a new breathing air system is installed, the air quality shall be tested more frequently to establish a baseline for changing the air purification agents. Once the baseline is established, the testing frequency can be adjusted according to the service life of the air purification agents.

(4) Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

f. For compressors that are not oil-lubricated, ensure that CO levels in the breathing air do not exceed 10 ppm. CO levels must be measured each time the compressor is moved to a new location. Portable breathing air- type compressors are not required to be tested for Grade D breathing air.

g. For oil-lubricated compressors, use a high-temperature or CO alarm, or both, to monitor CO levels. An "alarm" is an audible device that is installed on the oil-lubricated air compressor. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent CO in the breathing air from exceeding 10 ppm.

h. Ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

i. Use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR 84.

05.E.13 Identification of filters, cartridges, and canisters. Ensure that all filters, cartridges, and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

05.E.14 Training and information. Provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.

a. Ensure that each employee can demonstrate knowledge of at least the following:

(1) Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(2) What the limitations and capabilities of the respirator are;

(3) How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(4) How to inspect, put on and remove, use, and check the seals of the respirator;

(5) What the procedures are for maintenance and storage of the respirator;

(6) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(7) The general requirements of the OSHA respirator standard at 29 CFR 1910.134.

b. The training shall be conducted in a manner that is understandable to the employee.

c. Provide the training prior to requiring the employee to use a respirator in the workplace.

d. When it can be demonstrated by written documentation that a new employee has received training within the last 12 months that addresses the elements specified above, that employee is not required to repeat such training provided that the employee can demonstrate knowledge of those element(s). When training is not repeated, it must be provided no later than 12 months from the date of the previous training.

e. Retraining shall be administered annually, and when the following situations occur:

(1) Changes in the workplace or the type of respirator render previous training obsolete;

(2) Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(3) Any other situation arises in which retraining appears necessary to ensure safe respirator use.

f. The basic advisory information on respirators, as presented in the OSHA respirator standard at 29 CFR 1910.134, Appendix D, shall be provided in any written or oral format to employees who wear respirators when such use is not required by this section or by the employer.

05.E.15 Program evaluation. Conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and consult employees to ensure that they are using the respirators properly.

a. Conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

b. Regularly consult with employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(1) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(2) Appropriate respirator selection for the hazards to which the employee is exposed;

(3) Proper respirator use under the workplace conditions the employee encounters; and

(4) Proper respirator maintenance.

05.E.16 Recordkeeping. Establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

a. Medical evaluation. Records of medical evaluations must be retained and made available in accordance with 29 CFR 1910.1020.

b. Fit testing. Retain fit test records for respirator users until the next fit test is administered. Establish a record of the QLFT and QNFT administered to an employee including:

(1) The name or identification of the employee tested;

(2) Type of fit test performed;

(3) Specific make, model, style, and size of respirator tested;

(4) Date of test; and

(5) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

c. Retain a written copy of the current respirator program.

d. Written materials required by 05.E.15 shall be made available upon request to affected employees.

05.F BODY BELTS, HARNESSES, LANYARDS, AND LIFELINES - SELECTION OF COMPONENTS

05.F.01 Personal fall arrest, fall restraint and positioning device systems. ***Warning: Personal fall arrest systems are generally only certified up to a combined weight of 310 pounds (lb) (140.6 kilograms (kg)) including the weight of the person and equipment. Workers shall not be permitted to exceed this limit unless permitted in writing by the manufacturer. > All fall arrest systems shall meet the requirements contained in ANSI/American Society of Safety Engineers (ASSE) Z359.1.***

a. Personal fall arrest systems require the use of a full-body harness: body belts and chest waist harnesses are not acceptable as part of personal fall arrest systems.

b. The use of a body belt is permitted in positioning and restraint systems.

05.F.02 Fall Arrest Systems - General.

a. Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials; shall have corrosion resistant finish; and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

b. D-rings, locking-type snaphooks, and other connectors shall have a minimum tensile strength of 5,000 lb (2,267.9 kg); D-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 lb (1632.9 kg) without cracking, breaking, or taking permanent deformation. ***> Proof testing is typically conducted by the manufacturer, and a specification of proof testing supplied with the manufactured good.***

c. Personal fall arrest systems shall decelerate and bring the employee to a complete stop within 42 in (106.6 cm), excluding lifeline elongation, after free fall distance.

d. Personal fall arrest systems, when stopping or preventing a fall, shall not produce an arresting force on an employee of more than 10 times the employee's weight or 1,800 lb (816.4 kg), whichever is lower.

e. Positioning device systems shall prevent the user from free falling no more than 2 ft (0.6 m).

f. Fall restraint systems shall prevent the user from reaching an area where a free fall could occur.

g. Body harnesses shall consist of straps that are secured about a body in a manner that distributes the arresting forces over at least the thighs, waist, chest, shoulders, and pelvis, with provision for attaching a lanyard, lifeline, or deceleration device.

h. Snaphooks and carabiners shall be of the self-locking type.

05.F.03 Lifelines and lanyards.

a. Lanyards and vertical lifelines shall have a minimum tensile strength of 5,000 lbs (2,267.9 kg).

b. Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a factor of safety of at least two.

c. Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 ft (0.6 m) or less shall be capable of sustaining a minimum tensile load of 3,000 lbs (1,360.7 kg) applied to the device with the lifeline or lanyard in the fully extended position. Self-retracting lifelines and lanyards that do not limit free fall distance to 2 ft (0.6 m) or less, rip stitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 lb (2,267.9 kg) applied to the device with the lifeline or lanyard in the fully extended position.

d. Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.

e. Harness lanyards shall not be looped back over or through a large object and then attached back to themselves unless permitted by the manufacturer.

05.F.04 Lineman's equipment.

a. All fabric for safety straps shall be capable of withstanding an alternating current dielectric test of not less than 25,000 volts per foot "dry" for 3 minutes, without visible deterioration.

b. All fabric and leather used shall be capable of being tested for leakage current and not exceed 1 milliampere when a potential of 3,000 volts is applied to the electrodes 12 in (30.4 cm) apart.

c. Direct current testing may be permitted in lieu of alternating current testing.

05.G ELECTRICAL PROTECTIVE EQUIPMENT

05.G.01 Persons working on electrical distribution systems shall be provided with the appropriate electrical protective equipment, which shall be inspected, tested, and maintained in safe condition in accordance with the standards referenced in Table 5-4.

05.G.02 Employees may use rubber gloves, sleeves, blankets, covers, and line hose only when required by special conditions for work on energized facilities. Rubber goods provided to protect employees who work on energized facilities must meet ASTM specifications. Electrical workers' rubber insulating protective equipment shall be visually inspected for damage and defects prior to each use.

TABLE 5-4

STANDARDS FOR ELECTRICAL PROTECTIVE EQUIPMENT

SUBJECT	NUMBER AND TITLE
Head Protection	ANSI Z89.1, *Requirements for Protective Headwear for Industrial Workers*
Eye and face protection	ANSI/ASSE Z87.1, *Practice for Occupational and Educational Eye and Face Protection*
Gloves	ASTM D120, *Standard Specification for Rubber Insulating Gloves*
Sleeves	ASTM D1051, *Standard Specification for Rubber Insulating Sleeves*
Gloves and sleeves	ASTM F496, *Standard Specification for In-Service Care of Insulating Gloves and Sleeves*
Leather protectors	ASTM F696, *Standard Specification for Leather Protectors for Rubber Insulating Gloves and Mittens*
Footwear	ASTM F1117, *Standard Specification for Dielectric Overshoe Footwear*
	ANSI Z41, *Standard for Personnel Protection - Protective Footwear*
Visual inspection	ASTM F1236, *Standard Guide for Visual Inspection of Electrical Protective Rubber Products*
Apparel	ASTM F1506, *Standard Performance Specification for Flame Resistant Textile Materials for Wearing Apparel for Use by Electrical Workers When Exposed to Momentary Electric Arc and Related Thermal Hazards*

05.G.03 Electric flash protection shall be provided for any person who enters the flash protection zone ***(See 11.A.06)***. They must wear flame-resistant clothing and PPE, based on the incident exposure associated with the specific task. Refer to NFPA 70E for specific Hazard Risk Classifications and clothing/equipment requirements. ***> Synthetic clothing such as acetate, nylon, polyester, rayon, either alone or in blends with cotton, are prohibited in the flash protection zone.***

a. Employees must wear protective eye equipment whenever there is a danger from electric arcs, flashes, flying objects, or electrical explosion.

b. Employees must wear flame-resistant clothing whenever they may be exposed to an electric flash. If used, flash suits and their closure design must permit easy and rapid removal. The entire flash suit, including the window, must have energy-absorbing characteristics suitable for arc-flash-exposure. Use clothing and equipment to maximize worker protection. Clothing and equipment required by the degree of electrical hazard exposure can be worn alone or be integrated with normal apparel. Protective clothing and equipment must cover associated parts of the body and all normal apparel that is not flash-flame resistant, while allowing movement and visibility. ***> Do not wear synthetic materials that can melt next to skin.***

c. Employees must wear rubber-insulating gloves where there is a danger of hand or arm injury from electric shock or arc-flash burns due to contact with energized parts. Gloves made from layers of flame-resistant material provide the highest level of protection. Leather glove protectors should be worn over voltage-rated rubber gloves.

d. Dielectric overshoes are required where electrically insulated footwear is used for protection against step and touch potential.

e. Table 3-3.9.1 of Part II of NFPA 70E should be used to determine the Hazard/Risk category associated with each task. Once the Hazard/Risk category has been determined, refer to

Table 3-3.9.1 of Part II of NFPA 70E to determine the requirements for protective clothing or other PPE.

05.G.04 An air test shall be performed on electrical workers' rubber insulating gloves before each use.

05.G.05 Protective equipment of material other than rubber shall provide equal or better electrical and mechanical protection.

05.G.06 Only live-line tool poles having a manufacturer's certification to withstand at least the following tests shall be used:

a. 100,000 volts per foot of length for 5 minutes when the tool is made of fiberglass, or

b. 75,000 volts per foot of length for 3 minutes when the tool is made of wood, or

c. Other equivalent tests.

05.G.07 Only tools and equipment intended for live-line bare hand work shall be used on transmission lines. The tools shall be kept dry and clean and shall be visually inspected before use each day.

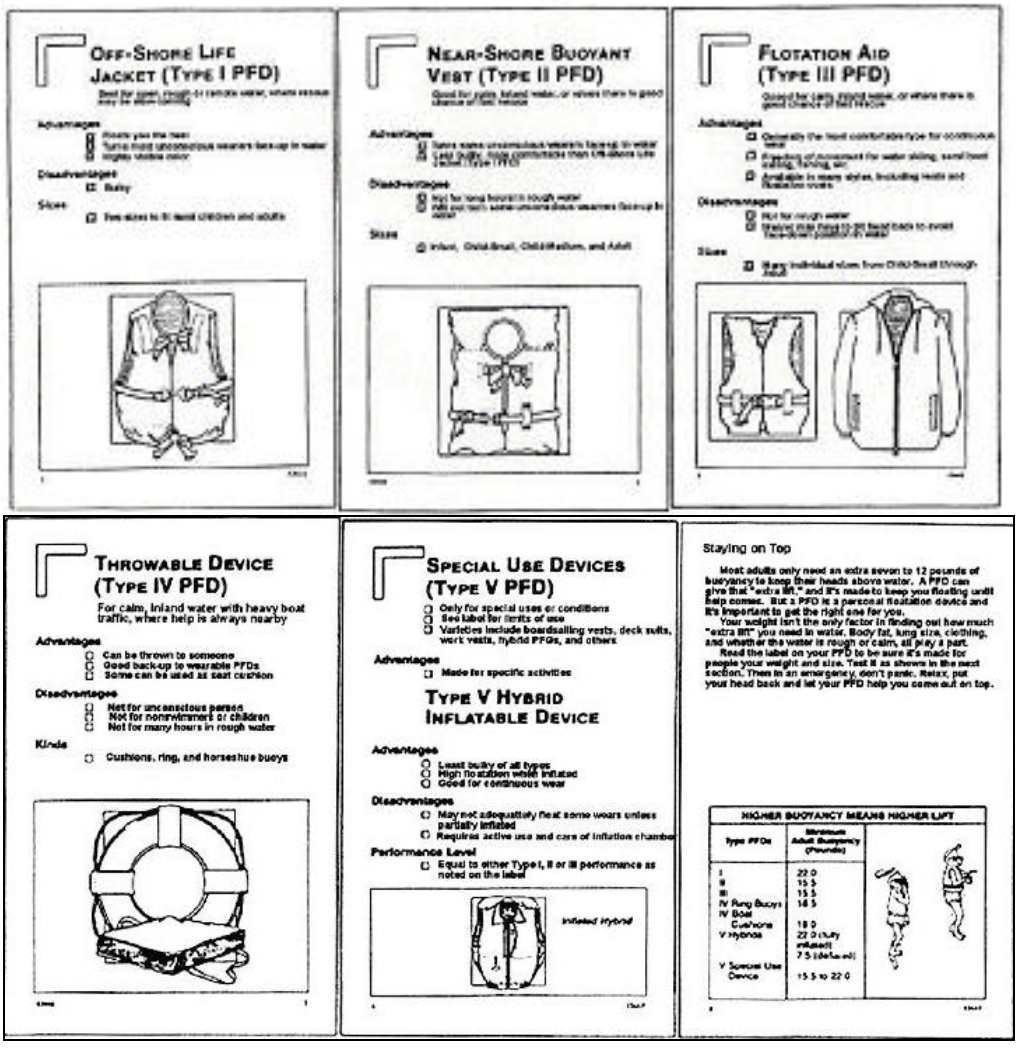
05.G.08 See Section 05.F for requirements on lineman's personal fall protection equipment.

05.H PERSONAL FLOATATION DEVICES

05.H.01 Type III, Type V work vests, or better U.S. Coast Guard (USCG)-approved International Orange personal floatation device (PFD) equipped with a USCG-approved automatically activated light (lights on Type III and Type V PFDs are not required on projects performed exclusively during daylight hours) and retroreflective tape shall be provided to and properly worn (zipped, tied, latched, etc., in closed fashion) by all persons in the following circumstances (inflatable PFDs will not be worn by workers on USACE sites): ***> See Figure 5-1.***

FIGURE 5-1

PERSONAL FLOATATION DEVICES



a. On floating pipelines, pontoons, rafts, or stages;

b. On structures or equipment (including heavy operating equipment that is not secured to the structure) extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees;

c. Working alone at night where there are drowning hazards, regardless of other safeguards provided;

d. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit; or

e. Wherever there is a drowning hazard.

05.H.02 Before and after each use, the PFD shall be inspected for defects that would alter its strength or buoyancy: defective devices or devices with less than 13-lb (5.8-kg) buoyancy shall be removed from service.

05.H.03 Throwable devices (Type IV PFD).

a. On USCG-inspected vessels, ring buoys are required to have automatic floating electric water lights as required by 46 CFR 160.

b. On all other floating plant and shore installations, lights on life rings are required only in locations where adequate general lighting (e.g., floodlights, light stanchions) is not provided. For these plants and installations, at least one life ring, and every third one thereafter, shall have an automatic floating electric water light attached.

c. All PFDs shall be equipped with retroreflective tape in accordance with USCG requirements.

d. Life rings (rope attachment not required) and ring buoys (rope attachment required) shall conform to the requirements of

46 CFR 160 (USCG approved) and should have at least 70 ft (21.3 m) of 3/8-in (0.9-cm) solid braid polypropylene, or equivalent, attached. Throw bags may be used in addition to life rings or ring buoys. Life rings or ring buoys shall be readily available and shall be provided at the following places:

(1) At least one on each safety skiff;

(2) At least one on all motor boats up to 40 ft (12.1 m) in length and at least two for motor boats 40 ft (12.1 m) in length or longer;

(3) At least two on any other piece or group of floating plant up to 100 ft (30.4 m) in length and one additional for each increase in length of 100 ft (30.4 m) or fraction thereof; and

(4) At least one at intervals of not more than 200 ft (60.9 m) on pipelines, walkways, wharves, piers, bulkheads, lock walls, scaffolds, platforms, and similar structures extending over or immediately next to water, unless the fall distance to the water is more than 45 ft (13.7 m), in which case a life ring shall be used. (The length of line for life rings at these locations shall be evaluated, but the length may not be less than 70 ft (21.3 m).)

05.H.04 At navigation locks, an analysis of the benefits versus the hazards of using floating safety blocks (blocks that may be quickly pushed into the water to protect individuals who have fallen in the water from being crushed by vessels) shall be made.

a. This analysis shall be documented as an AHA.

b. If the use of blocks is found acceptable, consideration shall be given to the size and placement of the blocks, the appropriate means of securing and signing the blocks, etc. When the use of blocks is found unacceptable, alternative safety measures shall be developed.

05.I LIFESAVING AND SAFETY SKIFFS

05.I.01 At least one skiff shall be immediately available at locations where employees work over or immediately next to water.

05.I.02 Personnel trained in launching and operating the skiff shall be readily available during working hours. Lifesaving personnel shall perform a lifesaving drill, including the launching and recovery of the skiff, before the initiation of work at the site and periodically thereafter as specified by the GDA (but at least monthly or whenever new personnel are involved).

05.I.03 Skiffs shall be kept afloat or ready for instant launching.

05.I.04 Required equipment must be onboard and meet or exceed USCG requirements and the requirements of Section 19 of this manual. Skiffs shall be equipped as follows:

a. Four oars (two if the skiff is motor powered);

b. Oarlocks attached to gunwales or the oars;

c. One ball-pointed boat hook;

d. One ring buoy with 70 ft (21.3 m) of 3/8-in (0.9-cm) solid braid polypropylene, or equivalent, line attached; and

e. PFDs in number equaling the skiff rating for the maximum number of personnel allowed on board.

05.I.05 In locations where waters are rough or swift, or where manually-operated boats are not practical, a power boat suitable for the waters shall be provided and equipped for lifesaving.

05.I.06 Skiffs and power boats shall have flotation tanks or buoyant material capable of floating the boat and its equipment and the crew.

05.I.07 On vessels (e.g., skiffs) without permanently mounted navigation lights, portable battery-operated navigation lights will be available and used for night operations.