

Section 8

Personal Protective Equipment

8.1 Requirements for Personal Protective Equipment

This section sets forth minimum personal protective equipment (PPE) requirements. It provides an overview of PPE requirements, including workplace assessment, PPE maintenance, and training. The supervisor will ensure that the workplace characterization is completed, and availability, proper use, and maintenance of equipment specified in this section. Section 7, “Occupational Health,” details the requirements for respirator use. Additionally, Section 16, “Fall Protection and Rope-Access Work,” details requirements for activities covered by that section.

8.1.1 Workplace Characterization. Assess each workplace to determine if hazards are present (or are likely to become present). Appropriate control measures will be implemented through the hierarchy of controls (i.e., eliminate, substitute, engineering controls, warnings, administrative controls, and PPE) to reduce the hazard to an acceptable level of risk. PPE will be selected based upon the actual worksite conditions, frequency, and duration of use to prevent exposure. Document the assessment in writing. Assessments are usually qualitative and document the general workplace, workforce, and the environmental agents; whereas the Job Hazard Analysis (JHA) is a process that identifies hazards associated with each step or task and develops solutions that will eliminate, mitigate, or prevent such hazards. Compliance guidelines for hazard assessment and PPE selection can be found in at [29 CFR 1910, Subpart I, App B](#).

8.1.2 PPE Selection and Use. Based upon the workplace characterization, appropriate PPE will be identified and selected for employee use. Employees are required to use approved PPE and safety equipment determined by their supervisor in coordination with a safety and health professional to provide acceptable levels of protection.

8.1.3 PPE Maintenance. Inspect PPE before each use. Maintain and store PPE properly. After each use, clean and sanitize PPE (as appropriate).

8.1.4 PPE Training. Provide training to each employee who wears PPE. This training will include answers to the following questions:

- What are the tasks that require the use of PPE?
- What PPE is necessary?
- How is the required PPE used?
- What are the limitations of the PPE?
- How is PPE properly maintained, inspected, and stored?

The employer shall retrain each employee when there is reason to believe that any affected employee does not have the understanding and skill to properly use the furnished PPE.

8.1.5 Visitor Protection. Advise visitors of the existing hazards in the area before planned visits or before permitting entrance to the area. By keeping visitors away from hazard areas and limiting access to designated routes, minimal protection will be required. Document visitor hazards with a JHA or hazard assessment of the work area, and consider providing visitors with uniquely colored vests, badges, or hard hats for easy identification.

8.2 Requirements for Head Protection

8.2.1 Required Hard Hats. Head protection is required when the work area or tasks include head trauma from falling objects, sparks, trauma from impact, and striking against hazards. All personnel, including contractors and visitors, will wear hard hats when entering or working in designated hard hat areas as determined by a hazard assessment or JHA.

8.2.2 Hard Hat Areas. Hard hat areas include all areas where a person may suffer head trauma from overhead materials, objects, or equipment, including overhead storage and striking against hazards. Areas also include any kind of construction, maintenance, or repair work unless exempted by the JHA process.

8.2.3 Posting of Hard Hat Areas. Conspicuous signs will be posted at all entrances to hard hat areas and at appropriate locations that designate the required head protection.

8.2.4 Hard Hat Design. Verify that hard hats comply with Type I, Class G or E, as specified in American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) Z89.1, “American National Standard for Industrial Head Protection.” Hard hats will be appropriate for environmental hazards such as heat and cold or toxic hazards. Confirm that hard hats worn by linemen, electricians, or employees working in tunnels, shafts, or near high-voltage conductors or apparatus conform to class E requirements of ANSI/ISEA Z89.1. Hard hats will have a manufacturer’s label indicating that its design complies with ANSI requirements.

8.2.5 Care and Use. No modification to the shell or suspension is allowed, except when such changes are approved by the manufacturer. No ball caps, knit caps, or other head dress will be worn under the hard hat that could interfere with the fit or stability of the hard hat. Accessories specifically designed to be used in conjunction with hard hats are permitted. Hard hats and components will be visually inspected daily in accordance with the manufacturer’s instructions for signs of damage that might reduce the safety

integrity originally provided. Hard hats will be periodically inspected for ozone or ultraviolet degradation as evidenced by cracking or flaking. Hard hats will be replaced as required by the manufacturer.

8.3 Requirements for Eye and Face Protection

Employees exposed to potential eye or face injury from impact, trauma, foreign bodies, heat, sparks, intense visible light, intense ultraviolet light, or collated laser light will be furnished and required to wear eye and/or face protection specifically designed for the exposure.

8.3.1 Design. Eye and face protection required by this subsection will comply with the standards published in the current ANSI/ISEA Z87.1, “Occupational and Educational Personal Eye and Face Protection Devices.”

8.3.2 Safety Glasses. Safety glasses are protective devices intended to shield the wearer’s eyes from a variety of hazards. While they may be used alone for primary protection, they are often used in conjunction with other protectors. Both the frames and the lenses (either plano or prescription) will meet ANSI Z87.1 and be marked with the manufacturer’s monogram. Only the frames will be marked with the Z87 logo to indicate compliance with the standard. All safety glasses will have side shields or be a wraparound style. See paragraph 8.5.10.b., “Eye Protection,” for additional requirements for electric arc flash protection, as well as paragraph 8.5.13, “Prohibited Articles,” for electrical hazard prohibitions.

8.3.3 Corrective Lenses. Protect employees who wear corrective lenses, when required to wear eye protection, with one of the following:

- a. Safety glasses with lenses that provide optical correction.
- b. Protective goggles or plano safety glasses that can be worn over corrective glasses or contact lenses.
- c. Goggles that incorporate corrective lenses mounted behind protective lenses.

8.3.4 Selection Guide. When selecting eye and face protection for the hazards and operations noted, use the information in tables 8-1 and 8-2.

Table 8-1.—Eye and face protector selection criteria

Hazard	Protectors	Limitations	Marking
Flying fragments, objects, large chips, particles, sand, dirt, etc.	<ul style="list-style-type: none"> • Safety glasses with side shields • Goggles with direct or indirect ventilation • Face shield worn over safety glasses or goggles¹ • Welding helmet 	The use of metal frame protective devices in electrical hazard areas is prohibited. Metal frame protective devices could potentially cause electrical shock and electrical burn through contact with, or thermal burns from exposure to, the hazards of electrical energy, which include radiation from accidental arcs.	Impact rated: + (safety lens) Z87+ (all other lenses) Z87+ (plano frame) Z87-2+ (Rx frame)
HEAT – Furnace operations, gas cutting and welding			
Hot sparks	<ul style="list-style-type: none"> • Safety glasses with side protection • Goggles with direct or indirect ventilation • Face shield worn over safety glasses or goggles¹ • Full-face-piece respirator • Loose-fitting respirator worn over safety glasses 	Safety glasses, and cup and cover type goggles, do not provide unlimited facial protection. Operations involving heat may also involve optical radiation. Protection from both hazards will be provided.	
Splash from molten metals	<ul style="list-style-type: none"> • Face shield worn over goggles • Full-face respirator • Loose-fitting respirator worn over safety glasses 		
High temperature exposure	<ul style="list-style-type: none"> • Screen face shield over safety glasses or goggles¹ • Reflective face shield over safety glasses or goggles¹ 		

Table 8-1.—Eye and face protector selection criteria

Hazard	Protectors	Limitations	Marking
CHEMICAL – Acid and chemical handling, degreasing, plating			
Splash and irritating mists	<ul style="list-style-type: none"> • Goggles with indirect ventilation (eyecup or cover type) • Face shield worn over safety glasses or goggles¹ • Full-face-piece respirator 	Atmospheric conditions and the restricted ventilation of the protector can cause the lenses to fog. Frequent cleaning may be required.	Splash/droplet: D3
Nuisance dust	<ul style="list-style-type: none"> • Goggles with direct or indirect ventilation (eyecup or cover type) • Full-face-piece respirator 		Dust: D4 Fine dust: D5
OPTICAL RADIATION			
Welding: electrical arc	<ul style="list-style-type: none"> • Welding helmet over safety glasses or goggles • Hand shield over safety glasses or goggles • Typical filter lens shade: 10-14 	Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance. Note: Filter lenses will meet the requirements for shade designations in table 8-2.	Welding: W shade number UV: U scale number Glare: L scale number IR: R scale number Variable tint: V Special purpose: S
Welding: gas	<ul style="list-style-type: none"> • Welding helmet over safety glasses • Welding goggles • Welding face shield over safety glasses or goggles • Typical filter lens shade: 4-8 		
Cutting	<ul style="list-style-type: none"> • Welding helmet over safety glasses or goggles • Welding goggles • Welding face shield 		

Table 8-1.—Eye and face protector selection criteria

Hazard	Protectors	Limitations	Marking
	over safety glasses or goggles <ul style="list-style-type: none"> • Welding respirator • Typical filter lens shade: 3-6 		
Torch brazing	<ul style="list-style-type: none"> • Welding helmet over safety glasses • Welding goggles • Welding face shield over safety glasses or goggles • Typical filter lens shade: 3-4 	Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance. Note: Filter lenses will meet the requirements for shade designations in table 8-2.	Welding: W shade number UV: U scale number Glare: L scale number IR: R scale number Variable tint: V Special purpose: S
Torch soldering	<ul style="list-style-type: none"> • Safety glasses • Welding face shield over safety glasses • Welding respirator • Typical filter lens shade: 1.5-3 	Shade or special purpose lenses (per ANSI/ISEA Z87.1)	
Glare	<ul style="list-style-type: none"> • Safety glasses with or without side protection • Face shield over safety glasses or goggles 	Shade or special purpose lenses (per ANSI/ISEA Z87.1)	

Source: ANSI/ISEA Z87.1, 2010, Annex I

¹ Face shields alone do not provide adequate eye protection and will be used in tandem with safety glasses or goggles that are impact rated.

Table 8-2.—Filter lenses for protecting against radiant energy

Operations	Electrode size in inches (millimeters)	Arc current (amperes)	Minimum¹ protective shade No.	Suggested shade No. (comfort)	
Shielded metal arc welding	<3/32 (2.4)	<60	7	7	
	3/32-5/32 (2.4-4.0)	60-160	8	10	
	5/32-1/4 (4.0-6.4)	160-250	10	12	
	>1/4 (6.4)	250-550	11	14	
Gas metal arc welding and flux-cored arc welding		<60	7	7	
		60-160	10	11	
		160-250	10	12	
		250-500	10	14	
Gas tungsten arc welding		<50	8	10	
		50-150	8	12	
		150-500	10	14	
Air carbon arc cutting	(light)	<500	10	12	
	(heavy)	500-1,000	11	14	
Plasma arc welding		<20	6	6-8	
		20-100	8	10	
		100-400	10	12	
		400-800	11	14	
Plasma arc cutting	(light) ²	<300	8	9	
	(medium) ²	300-400	9	12	
	(heavy) ²	400-800	10	14	
Torch blazing			3	3 or 4	
Torch soldering			2	2	
Carbon arc welding			14	14	
Operations	Plate thickness in inches	Plate thickness in millimeters	Minimum¹ protective shade		
Gas welding:					
	Light	<1/8	<3.2	4	4-5
	Medium	1/8-1/2	3.2-12.7	5	5-6
Heavy	>1/2	>12.7	6	6-8	
Oxygen cutting:					
	Light	<1	<25	3	3-4
	Medium	1-6	25-150	4	4-5
Heavy	>6	>150	5	5-6	

Source: 29 CFR 1910.133(a)(5),

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9778

¹ As a rule of thumb, start with a shade that is too dark to see the weld zone. Then, go to a lighter shade which gives a sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch or flux 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.

² These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the work piece.

8.3.5 Electric Welding. Employees will wear nonflammable welding helmets with lift-front or stationary-front lens when engaged in electric welding operations. Employees will wear plano or prescription safety glasses or flash goggles under the helmet to protect their eyes when raising the helmet. Helmet filter lens shades will conform to table 8-2. If autodarkening filters are incorporated into the helmet, the variable filter shade range will be marked on it as required in table 8-2. Include a special filter that blocks harmful radiation even if the main switching element fails, and meet ANSI Z87.1 for impact protection and switching index time.

8.3.6 Gas-Torch Cutting and Welding. When gas-torch cutting and welding, employees will wear eye protection having filter lenses that conform to the requirements in tables 8-1 and 8-2. Sunglasses do not meet this requirement.

8.3.7 Welder Helper or Inspector. Welder helpers or welding inspectors will wear flash goggles with a minimum lens shade of 2 in the general welding area. Helpers or inspectors observing actual welding operations will wear the same protection as the welder.

8.3.8 Laser Protection. Install and use lasers and laser systems according to the manufacturer's requirements and restrictions in ANSI Z136.1, "American National Standard for the Safe Use of Lasers." Employees whose work involves Class 3b or 4 laser beams will wear appropriate laser safety goggles.

8.4 Requirements for Hearing Protection

8.4.1 Control of Noise Exposure. Practical engineering or administrative controls will be first considered and used when personnel are subjected to sound pressure levels exceeding the limits specified in table 7-1 of Section 7, "Occupational Health." When such controls fail to reduce sound pressure levels to within the specified limit, PPE will be selected, evaluated, and used in accordance with a hearing loss prevention program.

8.4.2 Hearing Protective Devices. Use hearing protective devices (properly inserted ear plugs or ear muffs) whenever ambient noise levels equal or exceed 85 decibel amperes (dBA). Hearing protection provided will be capable of reducing employee noise exposure below an 8-hour TWA of 85 dBA. See Section 7, "Occupational Health," for additional selection and care instructions.

8.4.3 Hearing Device Labels. Use hearing protective devices labeled by the manufacturer according to U.S. Environmental Protection Agency (EPA) 40 CFR, Part 211, "Product Noise Labeling." Supervisors will verify that only appropriate hearing protective devices are used.

8.5 Requirements for Protective Clothing

8.5.1 Welding. Employees engaged in welding, gouging, cutting, or burning operations where physical contact hazards exist will wear protective equipment and clothing to prevent physical contact with sparks, slag, heat, and flame to skin and clothing. Employees engaged in these types of operations will wear flame resistant (FR) or leather gauntlet gloves, chrome-tanned leather or equivalent FR chaps and coats, or a combination that provides equal protection to prevent exposure to heat, sparks, slag, intense visible, and ultraviolet light generated during welding operations. They will wear FR or leather gloves and aprons when performing cutting, burning, gauging, plasma arc, and torch operations.

8.5.2 High-Visibility Clothing. Employees exposed to vehicular traffic on roadways or construction sites will wear high-visibility safety apparel with a label verifying that it is compliant with the appropriate performance class as defined in ANSI/ISEA 107, American National Standard for High-Visibility Safety Apparel and Headwear.” Contractor Safety Plans or Reclamation work plans will contain justification for the class of clothing provided to employees.

a. Performance Class 1. Performance Class 1 apparel will be used in activities where traffic speeds are less than 25 miles per hour, traffic is well separated from employees, and work tasks permit undivided attention to approaching traffic. Some examples include parking lot attendees, delivery drivers, sidewalk construction employees. Retroreflective material must cover at least 155 square inches.

b. Performance Class 2. Performance Class 2 apparel will be used where traffic speeds exceed 25 miles per hour, work tasks divert employee attention from traffic, or work is not well separated from traffic. Construction activities fall into this category. Some examples are survey crews, road construction crews, utility workers, construction work around heavy equipment, etc. Retroreflective material must cover at least 201 square inches.

c. Performance Class 3. Performance Class 3 apparel will be used when employees are exposed to traffic speeds that exceed 50 miles per hour or other situations where visibility from a greater distance is needed. Some examples are highway construction crews, flag crews, survey crews, etc. Retroreflective material must cover at least 310 square inches. Regardless of the area of materials used, a sleeveless garment or vest alone will not be considered Performance Class 3.

8.5.3 Chemical Protective Clothing. Chemical protective equipment will be selected for resistance to each/all of the chemicals present in the products being used. Protective clothing selected will be of the disposable

single use, or provisions to launder cloth protective clothing will be developed to prevent removal of contaminants from the site.

8.5.4 Gloves. Select hand protection based on the workplace characterization. Gloves will be provided and used to prevent contact with biological, chemical, and physical hazards, including hand vibrations. Substances which may require protection include acids, caustics, solvents, herbicides, infectious materials, and other toxic materials. Employees will wear leather-palm gloves when working with steel cables, barbed wire, rough-sawn timber, or other materials capable of causing lacerations. Insulating gloves will be worn when handling materials of extreme temperatures.

8.5.5 Rubber Insulating Goods. Employees will use rubber gloves, sleeves, blankets, covers, and line hose when required by special conditions for work on energized equipment and conductors to protect from the danger of electric shock. Rubber insulating goods that are provided to protect employees who work on energized conductors and equipment will meet American Society of Testing and Materials (ASTM) specifications as shown in table 8-3. Documented inspections will be performed as specified in table 8-3, and a visual inspection will be conducted prior to each use.

Table 8-3.—Standards for rubber insulating goods

Subject	When to test	Number and title	Standard for testing
Gloves	Before first issue and every 6 months thereafter	ASTM D120, "Standard Specification for Rubber Insulating Gloves"	ASTM F496, "Standard Specification for In-Service Care of Insulating Gloves and Sleeves"
Sleeves	Before first issue and every 12 months thereafter	ASTM D1051, "Standard Specification for Rubber Insulating Sleeves"	ASTM F496, "Standard Specification for In-Service Care of Insulating Gloves and Sleeves"
Blankets	Before first issue and every 12 months thereafter	ANSI/ASTM D1048, "Standard Specification for Rubber Insulating Blankets"	ASTM F479, "Standard Specification for In-Service Care of Insulating Blankets"
Covers	If insulating value is suspect	ANSI/ASTM D1049, "Standard Specification for Rubber Insulating Covers"	ASTM F478, "Standard Specification for In-Service Care of Insulating Line Hose and Covers"
Line hoses	If insulating value is suspect	ANSI/ASTM D1050, "Standard Specification for Rubber Insulating Line Hose"	ASTM F478, "Standard Specification for In-Service Care of Insulating Line Hose and Covers"
Mats		ANSI/ASTM D178, "Standard Specification for Rubber Insulating Matting"	

8.5.6 Protective Chaps. Employees who operate chain saws will wear protective chaps that meet ASTM F1897, “Standard Specification for Leg Protection for Chain Saw Users,” and ASTM F1414, “Standard Test Method for Measurement of Cut Resistance to Chain Saw in Lower Body (Legs) Protective Clothing.”

8.5.7 Foot Protection. Footwear selection will be based on a foot hazard assessment. When work endangers feet or requires special foot protection, employees will wear protective footwear that meets the requirements in ASTM F2413. All footwear will meet the basic I/75 “impact,” C/75 “compression” standards for the protective toe box. In addition, rubber footwear, including boots and packs, will meet the sole puncture-resistance requirements. Heavy-duty footwear will meet the MT/75 metatarsal requirements. Footwear with metatarsal guards provides protection to the metatarsal area of the foot that the safety toe box does not provide. Activities where heavy objects are lifted, or where the foot could be crushed from rolling hazards, require metatarsal protection. Employees exposed to energized electrical parts will have boots that are EH rated for “electrical hazards.” Work environments that require protective footwear include construction sites and activities, industrial areas, and underground work.

8.5.8 Minimum Wearing Apparel. Unless otherwise approved as uniform apparel by a first line supervisor, in coordination with the appropriate safety and health professional, all employees who work outdoors will wear, as a minimum, long pants to protect them from environmental and physical hazards, as well as shirts with a minimum 4-inch sleeve. Short pants, cutoffs, tank tops, or modified shirts are not acceptable. Open-toed shoes are not appropriate outside of an administrative environment. Apparel will protect areas where biological or chemical irritants could touch the skin.

8.5.9 Apparel Necessitated By Environmental Conditions. Extreme weather conditions, whether they be hot, cold, wet, windy, a caustic or toxic environment, or biologic hazards may necessitate additional protection of the employee than would be normally expected in the routine aspects of the job. A JHA will be conducted to analyze the hazards and to select the appropriate control method. For chemical hazards, the Material Safety Data Sheet will be used to assist in the selection of the appropriate employee protection. See Section 7, “Occupational Health,” for additional guidance on hot and cold environments.

8.5.10 Electric Arc Flash Protection. Based on the incident energy analysis or a task-based assessment (if determined appropriate by a qualified engineer), as stated in FIST 5-14, *Electrical Safety Program*, any person who enters the arc flash protection boundary (an approach limit at a distance from exposed live parts within which a person could receive a second-degree burn if an electrical arc flash were to occur) will wear appropriate PPE. The incident energy analysis will calculate the flash protection boundary for each item of

electrical equipment in the facility that is 50 volts or greater. The task-based assessment may be used as an interim step at all facilities until a detailed incident energy analysis is completed. All parts of the body inside the arc flash protection boundary will be protected.

a. Head, Face, Neck, and Chin Protection. Employees will wear nonconductive, arc-rated, head protection (ANSI Z89.1, Class E or G) and nonconductive PPE for the face, neck, and chin whenever there is a danger of injury from electric shock, burns, arcs, flashes, or from flying objects resulting from electrical explosion. If employees use hair nets and/or beard nets, these items must be nonmelting and flame resistant.

b. Eye Protection. Employees will wear protective eyewear whenever there is a danger of injury from electric arc, flashes, or from flying objects resulting from electrical explosion. If the worker's head is within the arc flash boundary, the worker's eyes must be protected from the thermal hazard as well. Safety glasses that meet the requirements of ANSI Z87.1 provide protection from impact and filter damaging ultraviolet energy. Always wear eye protection (safety glasses or goggles) under face shields or hoods. The face shield will have an arc rating at least as great as the predicted incident energy.

c. Hearing Protection. Hearing protection will be worn for all hazard risk categories to protect against the high noise potential from an electric arc blast.

d. Body Protection. Employees will wear AR clothing whenever they may be exposed to an electric arc flash above the threshold incident energy level for a second-degree burn (1.2 calories per square centimeter [cal/cm^2]). Flash suits and their closure design will permit easy and rapid removal. Garments such as rain gear worn as an outer layer over AR clothing will also be made of AR materials. The entire flash suit, including the window, will have energy-absorbing characteristics suitable for arc-flash exposure. Use clothing and equipment to maximize employee protection. Do not wear meltable synthetic fibers next to the skin.

e. Hand and Arm Protection. Employees will wear rubber insulating gloves whenever there is a danger of hand and arm injury from electric shock and burns due to contact with energized parts. Wear hand and arm protection when the possibility of arc flash burn exists. Gloves made from layers of AR material provide the highest level of hand arc flash protection. Heavy-duty leather gloves also provide good protection. Where voltage-rated gloves are used, wear leather protectors over the rubber gloves.

f. Foot and Leg Protection. Dielectric overshoes are required where electrically insulated footwear is used as a protection against step and touch potential. Heavy-duty leather work shoes normally provide a significant degree of protection to the feet from arc flash. Shoes made from lightweight material will not be selected. If the arc flash analysis indicates that the worker's legs could be exposed to an arc flash, AR clothing worn to protect the lower torso also must protect the worker's legs from exposure.

8.5.11 Determination of Appropriate Clothing. Where it has been determined that work will be performed within the arc flash protection boundary, one of the following methods will be used for the selection of protective clothing and other PPE to adequately protect the employee.

a. Incident Energy Analysis. An incident energy analysis will be performed to document the incident energy exposure of the employee (in cal/cm²). The incident energy exposure level will be based on the working distance of the employee's face and chest area for a potential arc source for the specific task to be performed. Arc rated clothing and other PPE will be selected based on the incident energy exposure associated with the specific task. Additional PPE shall be used for any parts of the body that are closer than the distance at which the incident energy was determined. FIST 5-14, Appendix E, describes protective clothing characteristics, hazard risk categories, and required minimum arc flash ratings.

b. Hazard/Risk Categories. The requirements in the latest National Fire Protection Association (NFPA) 70E, paragraphs 130.7(C)(15) and 130.7(C)(16), shall be used for selecting and using personal and other protective equipment. When this method is selected, tables 130.7(C)(15)(a) and 130.7(C)(15)(b) shall be used to determine the hazard/risk category and requirements for using rubber insulating gloves and insulated and insulating hand tools for a task. The assumed maximum short-circuit current capacities and maximum fault clearing times for various tasks are listed in table 130.7(C)(15)(a). For tasks not listed, or for power systems with greater than the assumed maximum short-circuit current capacity or with longer than the assumed maximum fault clearing times, an incident energy analysis shall be required in accordance with Table 130.5. Once the hazard/risk category has been identified from tables 130.7(C)(15)(a) and 130.7(C)(15)(b) (including associated notes), as well as the requirements of Table 130.7(C)(15), table 130.7(C)(16) shall be used to determine the required PPE for the task. Table 130.7(C)(16) lists the requirements for protective clothing and other protective equipment based on Hazard/Risk Categories 0 through 4. This clothing and equipment shall be used when working within the arc flash boundary.

As an alternative to using tables 130.7(C)(15)(a and b) and 130.7(C)(16), NFPA70E, Annex H, Table H.2 (Simplified, Two Category, AR Clothing System) provides a quicker method of determining appropriate clothing for use within the flash protection boundary of energized electrical equipment. This simplified method will only be used as an interim measure until a detailed incident energy analysis and appropriate hazard level are calculated.

8.5.12 Synthetic Clothing Not Permitted. Do not wear synthetic clothing such as acetate, nylon, polyester, polypropylene, or spandex in fabric underlayers. These materials will melt into the skin when exposed to high temperatures and can aggravate a burn injury. An incidental amount of elastic used on nonmelting fabric underwear or socks is permitted.

8.5.13 Prohibited Articles. Do not wear conductive articles of jewelry and clothing (such as watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, metal headgear, or metal frame glasses) where they can present an electrical contact hazard with live parts, unless such articles are rendered nonconductive by covering, wrapping, or other insulating means.

8.6 Protection Against Drowning

Provide U.S. Coast Guard (USCG) approved type III or type V personal flotation devices (PFDs) to employees when working on or around water where a drowning hazard exists. Employees will properly wear (zipped, latched, tied, etc., in a closed fashion) the provided devices. Where USCG approved type V auto-inflating PFDs are selected, they must be carefully inspected before each use to ensure that the inflator mechanism is armed and in good condition. The bladder must not leak, and the user must be familiar with its use and operation. An auto-inflatable PFD must be worn as the outermost layer.

8.6.1 Design. The PFD will be of a highly visible color and will have at least 200 square centimeters of retroreflective material attached to both the front and the back. If the PFD is reversible, retroreflective material will be attached to each of its reversible sides.

8.6.2 Inspection And Replacement. Before each use, visually inspect each PFD for defects that would compromise its strength or buoyancy. Check the PFD for rips, tears, and holes and ensure that seams and fabric straps are satisfactory. There must be no signs of waterlogging, mildew odor, or shrinkage of the buoyant materials. Metal or plastic hardware used to secure the PFD on the wearer will not be broken, deformed, or weakened by corrosion. Webbing or straps used to secure the PFD on the wearer will not be ripped, torn, or separated from an attachment point on the PFD. If any of

the aforementioned defects are found, or others are identified in the manufacturer's instructions, do not use the PFD; replace it immediately.

8.6.3 Ring Buoys. Install ring buoys, approved by the USCG, with at least 90 feet of line at 200-foot intervals on worksites where a water hazard exists. On an annual basis, visually inspect and document each ring buoy and rope for defects that would compromise their strength or buoyancy, and replace them as needed.

8.6.4 Lifesaving Skiffs. Provide one or more lifesaving boats or skiffs where employees work over or immediately adjacent to water, if determined necessary by a JHA. Persons trained in launching and operating the skiff will be immediately available during working hours. Use the skiff only for drills and in emergencies. Lifesaving skiffs will have the following equipment on board:

- Four oars (two if motor powered)
- Oarlocks attached to the gunwales or to the oars
- One ball-pointed boat hook
- At least one ring buoy with 90 feet of line attached
- One life preserver or work vest for each crew member, and additional devices necessary for rescued persons
- Emergency lighting

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

8.7 Other Protective Equipment

Other sections of these *Reclamation Safety and Health Standards* cover other protective equipment, fall protection, fire and rescue devices, first aid and medical facilities, seatbelts, and special devices and equipment for protecting employees from specific hazards. Employees will use such specified protective equipment when exposed to the respective hazards.