

Section 1.07 Personal Protective Equipment

1. Scope

This section sets forth requirements for personal protective equipment (PPE), including workplace assessment, PPE maintenance, and training. This section applies to all Reclamation employees, contractors and visitors who select, purchase, or use PPE. Reclamation Safety and Health Standards (RSHS) Section 2.08, Respiratory Protection, details the requirements for respirator use. RSHS Section 1.13, Fall Protection, details PPE requirements for activities requiring fall protection.

2. General Requirements

Reclamation's objective is to eliminate or minimize exposure to hazards. The primary tool Reclamation uses to do this is the hierarchy of controls, which prioritizes hazard controls in order from most effective to least effective. The hazard controls in the hierarchy are:

- elimination,
- substitution,
- engineering controls,
- administrative controls, and
- PPE.

Since PPE is the least effective method of hazard control and mitigates the least amount of risk, it must be used in conjunction with other, more effective means of hazard control whenever feasible. All other means of controlling a hazard must be considered and determined infeasible before PPE is selected as the sole primary hazard control.

3. Responsibilities

a. First-Line Supervisors

- Ensure that the workplace assessment is completed and that employees have the PPE and associated training to perform work safely.
- Review and sign Job Hazard Analyses (JHAs) for their employees, ensuring the JHA identifies the PPE needed to mitigate the hazards of the job.

b. On-Site Job Leads

- Inspect PPE before use.
- Verify that employees using PPE have been trained in its proper use.
- Ensure the PPE identified in the JHA is used.

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c. People Doing the Work

- Shall attend annual training for all PPE that is required by Occupational Safety and Health Administration (OSHA) regulations.
- Shall inspect PPE before use.
- Correctly put on, use, and take off PPE as instructed in training.
- Maintain and store PPE in accordance with the manufacturer instructions.

d. Regional Safety Manager

- Assist facilities in the region with technical questions related to PPE, including sharing technical advancements and best practices.

e. Project Manager/Acquisitions

- Support acquisitions of PPE that meets or exceeds the safety requirements of the job as identified in the JHA.

f. Joint Host and Contract Employer

- Follow Reclamation PPE safety requirements, as specified in the contract. These include the requirements of this RSHS section, and all PPE requirements found in other RSHS sections.

4. Training Requirements

Employees shall be trained in the use, care, and limitations of all required PPE.

a. Training

- Initial. Employees must be trained in and demonstrate an understanding of the following aspects of PPE before use: selection (for the specific hazard); correctly putting on, adjusting, and taking off the equipment; limitations and useful life; inspection and testing; and proper care, including maintenance, storage, and disposal.
- Refresher/Recertification. The supervisor shall coordinate training for their employees when there is an annual OSHA training requirement (e.g., for respirators and hearing protection) and retrain an employee when there is reason to believe that the employee does not have the understanding and skill to use the furnished PPE properly.
- Recordkeeping. Reclamation managers/supervisors are responsible for ensuring all training (including any retraining) for PPE is documented in the agency system of tracking training.

5. Hazard Identification, Assessment, and Safety Measures

a. Workplace Assessment

Supervisors will assess each workplace to determine if hazards are present or are likely to become present. Appropriate control measures must be implemented through the hierarchy of

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controls to reduce the hazard to an acceptable level of risk. When controlling workplace hazards, using PPE is the last option to address hazards; first consider if there are better ways to mitigate them. Selection of PPE will be based on the actual worksite conditions, especially the anticipated frequency and duration of exposure to identified hazards.

b. Documentation

Document the workplace assessment in writing as outlined in Section 1.04, Work Planning. Workplace assessments identify the hazards of the general workplace, workforce, and environment (whereas the JHA identifies hazards associated with each step or task of a specific job and develops solutions that will eliminate, mitigate, or prevent such hazards).

c. Compliance Guidelines

Follow the compliance guidelines for hazard assessment and PPE selection found in 29 CFR 1910, Subpart I, Appendix B.

6. Pre-job Briefing and Planning Requirements

Prior to starting work, employees must be briefed on the known safety hazards present in the work area. Job tasks with known and assumed risks must have an existing JHA readily available that identifies PPE used to mitigate hazards. Employees and supervisors must review the JHA prior to performing work and confirm that the PPE identified in the JHA is appropriate and available for use.

7. Hazardous Environmental Conditions (Weather/Other)

Whenever possible, schedule outdoor work for a time that will minimize exposure to inclement weather. When this is not possible, ensure the JHA includes controls to mitigate weather conditions, including PPE designed for outdoor use.

8. Personal Protective Equipment

PPE is clothing, headwear, eyewear, footwear, or other garments or equipment designed to protect the wearer's body from injury or illness. PPE can lessen physical, electrical, thermal, chemical, biological, radiological, and airborne particulate hazards. PPE is provided to employees by Reclamation; it is not part of the ordinary and usual clothing (e.g., long pants, warm clothing in winter, etc.) an employee may reasonably be expected to provide for himself or herself.

a. PPE Selection and Use

Appropriate PPE will be identified and selected according to the hazards identified in the workplace assessment or noted on the safety data sheet (SDS) and JHA. 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.

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The supervisor and safety professional will consult with the employee(s) in selecting PPE, and employees are required to wear/use selected PPE to provide that appropriate level of protection. The selection and purchase of PPE must be approved by the supervisor in writing, documented on form 7-2687, and attached to the purchase card statement.

b. PPE Maintenance

Inspect PPE before each use. Maintain and store PPE per manufacturer recommendations. As appropriate, clean and sanitize PPE after each use. Defective or damaged PPE that has exceeded its useful life shall not be used and shall be tagged as out of service and/or immediately removed from the work site to prevent its use.

c. Visitor Protection

Inform visiting workers and visitors of the existing hazards in an area before planned visits or before permitting entrance to the area. Whenever possible, keep visitors away from hazard areas and limit access to designated routes. Document visitor hazards with a JHA or hazard assessment of the work area and communicate with visiting workers or visitors prior to the on-site visit to explain what PPE will be required, what PPE can be provided locally, and what PPE the visiting worker/visitor will need to bring.

9. Other Safety Equipment

Other sections of the RSHS cover other protective equipment not included in this section such as fall protection, fire and rescue devices, first aid and medical facilities, seatbelts, respiratory protection, and special devices and equipment for protecting employees from specific hazards. Employees, contractors and visitors will consult this section and all other RSHS sections relevant to the work being performed and use all specified protective equipment required for exposure to the hazards of the work.

10. Safe Practices

a. Head Protection

- **Required Head Protection.** Head protection is required when the work area or tasks include risk of head trauma from falling objects, sparks, or impact or collision with hazards. Head protection must be selected according to the anticipated hazards of the job and worksite. For example, a hard hat is appropriate on a construction site where overhead hazards are common, whereas a climbing helmet is appropriate for a job where side impacts are more likely than overhead impacts. All personnel, including contractors and visitors, will wear hard hats when entering or working in hard hat areas as designated by a hazard assessment or JHA.
- **Hard Hat Areas.** Hard hat areas include all areas where a person may suffer head trauma from overhead materials, objects, or equipment, or from striking against any other hazards. Hard hat areas also include areas where any kind of construction,

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maintenance, or repair work is being performed, unless exempted by the JHA process or the facility's site safety plan.

- **Posting of Hard Hat Areas.** Conspicuous signs must be posted at all entrances to hard hat areas and in any location where visual information about required PPE is present.
- **Head Protection Type and Class.** For industrial and construction worksites, verify that hard hats comply with Type I or Type II, Class C, G, E requirements, as specified in American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) Z89.1, Industrial Head Protection. Hard hats will be appropriate for environmental hazards, such as heat and cold or chemical hazards. Hard hats worn by linemen, electricians, or employees working in tunnels, in shafts, or near high-voltage conductors or apparatus shall conform to Class E requirements of ANSI/ISEA Z89.1. Hard hats and helmets must have a manufacturer's label indicating that the design complies with ANSI requirements.
- **Care and Use.** No modification to the shell or suspension of head protection is allowed. No ball caps, knit caps, or other head dressing that could interfere with the fit or stability of the head protection will be worn under the head protection. Accessories specifically designed to be used in conjunction with hard hats and helmets are permitted. Hard hats and components will be visually inspected daily in accordance with the manufacturer's instructions for identifying signs of damage that might reduce the hat's safety integrity. Hard hats will be periodically inspected for ozone or ultraviolet degradation as evidenced by cracking or flaking. Hard hats will be replaced according to the recommendations of the manufacturer.

b. 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 laser light will be furnished and required to wear eye and/or face protection specifically designed for the exposure.

- **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.
- **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 protection, they are often used in conjunction with other protectors. Both the frames and the lenses (either plano or prescription) will meet the requirements of ANSI/ISEA Z87.1. Only the frames must be marked with the +Z87 logo to indicate compliance with the standard. All safety glasses will have side shields or be of a wraparound style when there is a hazard from flying objects. See paragraph 1.07.10.n.5, "Eye Protection," for additional requirements for electric arc flash protection, as well as paragraph 1.07.10.n.3, "Prohibited Articles," for electrical hazard prohibitions.

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- Corrective Lenses. When employees who wear corrective lenses are required to wear eye protection, provide them with one of the following:
 - safety glasses with lenses that provide optical correction to the employee's prescription,
 - protective goggles or plano safety glasses that can be worn over corrective glasses, and
 - goggles that incorporate corrective lenses mounted behind protective lenses.
- Selection Guide. When selecting eye and face protection for specific hazards and operations, refer to the requirements in Tables 1.07-1, 1.07-2, and 1.07-3.

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TABLES 1.07-1 Eye and Face Protector Selection Guide

1.07-1.1 GENERAL

Hazards	Protectors	Limitations	Markings
<p>Flying fragments, objects, large chips, particles, sand, dirt, etc.</p> <p>Hot Sparks</p>	<ul style="list-style-type: none"> • Safety glasses with side shields • Goggles with direct or indirect ventilation • Face shield worn over safety glasses or goggles • Welding helmet • Safety glasses with side • Shields • Goggles with direct or indirect ventilation • Face shield worn over safety glasses or goggles • Full-face respirator • Loose-fitting respirator worn over safety glasses 	<ul style="list-style-type: none"> • Protective devices with metal frames used in electrical hazard areas could potentially cause electrical shock, electrical burns, or thermal burns via electrical energy, including through radiation from accidental arcs. • Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. • 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. • Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	<p>Impact rated + (safety lens) Z87+ (all other lenses) Z87+ (plano frame) Z87-2+ (Rx frame)</p>

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1.07-1.2 HEAT—Furnace Operations, Gas Cutting, and Welding

<p>Splash from molten metals</p>	<ul style="list-style-type: none"> • Face shield worn over safety glasses or goggles • Full-face respirator • Loose-fitting respirator worn over safety glasses 	<ul style="list-style-type: none"> • 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. • Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	
<p>High temperature exposure</p>	<ul style="list-style-type: none"> • Screen face shield worn over safety glasses or goggles • Reflective face shield worn over safety glasses or goggles 	<ul style="list-style-type: none"> • 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. • Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	

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1.07-1.3 OPTICAL RADIATION

Hazards	Protectors	Limitations	Markings
Welding: electrical arc	<ul style="list-style-type: none"> Welding helmet over safety glasses or goggles Hand-held shield over safety glasses or goggles (for inspectors and observers) 	<ul style="list-style-type: none"> Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance. Filter lens shade for this type of work is typically from 10 to 14. Filter lenses must meet the requirements for shade designations in Table 1.07-2. Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	<ul style="list-style-type: none"> 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 or goggles Welding goggles Welding face shield over safety glasses or goggles 	<ul style="list-style-type: none"> Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance. Filter lens shade for this type of work is typically from 4 to 8. Filter lenses must meet the requirements for shade designations in Table 1.07-2. Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	<ul style="list-style-type: none"> Welding: W shade number UV: U scale number Glare: L scale number IR: R scale number Variable tint: V Special purpose: S

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Hazards	Protectors	Limitations	Markings
Cutting	<ul style="list-style-type: none"> Welding helmet over safety glasses or goggles Welding goggles Welding face shield over safety glasses or goggles Welding respirator 	<ul style="list-style-type: none"> Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance. Filter lens shade for this type of work is typically from 3 to 6. Filter lenses must meet the requirements for shade designations in Table 1.07-2. Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	<ul style="list-style-type: none"> Welding: W shade number UV: U scale number Glare: L scale number IR: R scale number Variable tint: V Special purpose: S
Torch brazing	<ul style="list-style-type: none"> Welding helmet over safety glasses or goggles Welding goggles Welding face shield over safety glasses or goggles 	<ul style="list-style-type: none"> Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance. Filter lens shade for this type of work is typically from 3 to 4. Filter lenses must meet the requirements for shade designations in Table 1.07-2. Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Protection from optical radiation is directly related to filter lens density. Select the darkest shade that 	

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Hazards	Protectors	Limitations	Markings
	<ul style="list-style-type: none"> • Welding respirator 	<p>allows adequate task performance. Filter lens shade for this type of work is typically from 1.5 to 3.</p> <ul style="list-style-type: none"> • Filter lenses must meet the requirements for shade designations in Table 1.07-2. • Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	
Glare	<ul style="list-style-type: none"> • Safety glasses with or without shields • Face shield over safety glasses or goggles 	<ul style="list-style-type: none"> • Face shields alone do not provide adequate eye protection and must be used in tandem with safety glasses or goggles that are impact rated. 	

Source: ANSI/ISEA Z84.1, 2010, Annex I

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1.07-3.7 OPERATION—Torch Brazing

Electrode Size	Arc Current (amperes)	Recommended Shade Number	Minimum Required Shade Number ¹
-	-	3-4	3

1.07-3.8 OPERATION—Torch Soldering

Electrode Size	Arc Current (amperes)	Recommended Shade Number	Minimum Required Shade Number ¹
-	-	2	2

1.07-3.9 OPERATION—Carbon Arc Welding (CAW)

Electrode Size	Arc Current (amperes)	Recommended Shade Number	Minimum Required Shade Number ¹
-	-	14	14

Source: 29 CFR 1910.133(a)(5)

c. Welding Protection

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

- Electric Welding. Employees will wear nonflammable welding helmets with lift- front or stationary-front lenses 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 Tables 1.07-2 and 1.07-3. If auto darkening filters are incorporated into the helmet, the variable filter shade range will be marked on it as required in Table 1.07-2. Auto darkening helmets must include a special filter that blocks harmful radiation even if the main switching

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element fails and shall meet ANSI/ISEA Z87.1 requirements for impact protection and switching index time.

- Gas-Torch Cutting and Welding. When gas-torch cutting and welding, employees will wear eye protection with filter lenses that conform to the requirements in Tables 1.07-1, 1.07-2, and 1.07-3. Sunglasses do not meet this requirement.
- 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.

d. Laser Protection

Install and use lasers and laser systems according to the manufacturer's requirements and the restrictions in ANSI/LIA Z136.1, Safe Use of Lasers. Employees whose work involves Class 3b or Class 4 laser beams will wear appropriate laser safety goggles.

e. Hearing Protection

- Control of Noise Exposure. Practical engineering or administrative controls must be considered and applied when personnel are subject to sound pressure levels exceeding the limits specified in RSHS Section 2.07, Hearing Loss Prevention Program. When such controls alone are not sufficient 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 as specified in RSHS Section 2.07, Hearing Loss Prevention Program.
- Hearing Protection Devices. Use hearing protection devices (properly inserted ear plugs or earmuffs) whenever noise levels equal or exceed 82 decibels, A scale (dBA) based on a 3 dB exchange rate. Provided hearing protection must reduce employee noise exposure below an 8-hour time-weighted average of 85 dBA. See Section 2.07, Hearing Loss Prevention Program, for additional selection and care instructions.
- Hearing Device Labels. Use hearing protection devices labeled by the manufacturer in accordance with 40 CFR 211, Product Noise Labeling. Supervisors will verify that only appropriate hearing protection devices are used.

f. High Visibility Clothing

- Performance Class 1. Performance Class 1 apparel will be used when 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 of employees that may appropriately use Performance Class 1 apparel are parking lot attendees, delivery drivers, and sidewalk construction employees. Retroreflective material must cover at least 155 square inches.
- Performance Class 2. Performance Class 2 apparel will be used when traffic speeds exceed 25 miles per hour, work tasks divert employee attention from traffic, or employees are not well separated from traffic. Construction activities fall into this

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category. Some examples of employees that may appropriately use Performance Class 2 apparel are survey crews, road construction crews, utility workers, and construction workers working around heavy equipment. Retroreflective material must cover at least 201 square inches.

- Performance Class 3. Performance Class 3 apparel will be used when employees are exposed to traffic speeds that exceed 50 miles per hour or anytime visibility from a greater distance is needed. Some examples of employees that may appropriately use Performance Class 3 apparel are highway construction crews, flag crews, and survey crews. Retroreflective material must cover at least 310 square inches. A sleeveless garment or vest alone will not be considered Performance Class 3, regardless of the area covered by retroreflective material.

g. Chemical Protective Clothing

Chemical protective equipment will be selected that is resistant to all of the chemicals present in the products being used. Protective clothing selected will be of the disposable, single-use type, or else provisions will be made to launder protective clothing to prevent removal of contaminants from the site.

h. Gloves

Select hand protection on the basis of the workplace assessment. Gloves will be provided by Reclamation and used by employees to prevent contact with biological, chemical, and physical hazards, including vibration. Substances from which employees may require protection include acids, caustics, solvents, herbicides, infectious materials, and other toxic materials. Employees will wear leather-palm gloves or equivalent cut-resistant gloves when working with steel cables, barbed wire, rough-sawn timber, or other materials capable of causing lacerations. Employees will wear insulating gloves when handling materials of extreme temperatures.

i. Rubber Insulating Goods

When required by special conditions, employees will use rubber gloves, sleeves, blankets, covers, and line hose for work on energized equipment and conductors to protect from the danger of electric shock. Rubber insulating goods will meet American Society of Testing and Materials (ASTM) standard specifications as shown in Table 1.07-4 Documented inspections will be performed as specified in Table 1.07-4, and a visual inspection will be conducted prior to each use.

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TABLE 1.07-4 Standards for Rubber Insulating Goods

Equipment	When to test	Standards	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	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 and after repair	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 and after repair	ASTM D1050, Standard Specification for Rubber Insulating Line Hose	ASTM F478, Standard Specification for In-Service Care of Insulating Line Hose and Covers
Mats	-	ASTM D178, Standard Specification for Rubber Insulating Matting	-

j. 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 Chainsaw in Lower Body (Legs) Protective Clothing.

k. Foot Protection

Select footwear on the basis of 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, Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear. All footwear will meet the basic I/75 impact and 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

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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 by rolling hazards require footwear with metatarsal protection. Employees exposed to energized electrical parts will have boots that are electrically rated “EH” for “electrical hazards.” Examples of work environments that require protective footwear include construction sites, industrial areas including powerplants, warehouses, and underground work areas.

I. Minimum Work Apparel

All employees who work outdoors will wear, at a minimum, long pants and shirts with a minimum 4-inch sleeve to protect themselves from environmental and physical hazards, unless other apparel is approved by a first-line supervisor in coordination with the appropriate safety and health professional(s). 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. Minimum wearing apparel is to be furnished by the employee.

m. Apparel Necessitated by Environmental Conditions

Extreme weather conditions (e.g., excessive hot, cold, wet, or windy conditions), a caustic or toxic environment, or biological hazards may necessitate additional protection for the employee beyond what would normally be expected for the routine aspects of the job. A JHA will be conducted to analyze the hazards and to select the appropriate control methods. For chemical hazards, the SDS as well as other information provided in this section will be used for selecting the appropriate employee protection. See RSHS Section 2.06, Health Hazard Assessments, for additional requirements on hot and cold environments.

n. Arc Flash Protection

As stated in Facilities Instructions, Standards, and Techniques (FIST) Volume 5-14, Electrical Safety Program, any person who enters the arc flash protection boundary for an item of electrical equipment will wear appropriate PPE. The arc flash protection boundary is the distance from exposed live electrical parts within which a person could receive a second-degree burn if an electrical arc flash were to occur. The arc flash protection boundary is determined by an incident energy analysis or, if deemed appropriate by a qualified engineer, by a task-based assessment. An incident energy analysis will calculate the flash protection boundary for each item of electrical equipment in a 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. Clothing must meet ASTM 1506 Standard Performance Specification for Flame Resistant and Electric Arc Rated Protective Clothing Worn by Workers Exposed to Flames and Electric Arcs and must be laundered consistent with manufacturer recommendations.

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- **Determination of Appropriate Clothing.** When it has been determined that work will be performed within the arc flash protection boundary, one of the following methods will be used for selecting protective clothing and other PPE to adequately protect the employee.
 - **Incident Energy Analysis.** An incident energy analysis will be performed to document the incident energy exposure to the employee (in calories per square centimeter [cal/cm²]). The incident energy exposure level will be specific to the task to be performed and will be based on the working distance of the employee's face and chest area from a potential arc source. Arc-rated clothing and other PPE will be selected according to the incident energy exposure associated with the specific task. Additional PPE shall be used for any parts of the body that are closer to the potential arc source than the distance used to calculate the incident energy.
 - **Hazard/Risk Categories.** The requirements in the latest National Fire Protection Association (NFPA) 70E, Standard for Electrical Safety in the Workplace, paragraphs 130.7(C)(15) and 130.7(C)(16), shall be used for selecting and using personal and other protective equipment. 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)(15)(c) lists the requirements for protective clothing and other protective equipment based on hazard/risk categories 1 through 4. This clothing and equipment shall be used when working within the arc flash boundary.
- **Synthetic Clothing Not Permitted.** Do not wear synthetic fabrics such as acetate, acrylic, nylon, polyester, polyethylene, polypropylene, or spandex in clothing underlayers. These materials can melt into the skin when exposed to high temperatures and can aggravate a burn injury. An incidental amount of elastic used on non-melting fabric underwear or socks is permitted.
- **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) when they can present an electrical contact hazard with live parts or when within the restricted approach boundary.
- **Head, Face, Neck, and Chin Protection.** Employees will wear nonconductive, arc-rated head protection that meets Class E or Class G specifications of ANSI/ISEA Z89.1,

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Industrial Head Protection, and nonconductive PPE for the face, neck, and chin whenever there is a danger of injury from electric shock, burns, arcs, or flashes or from flying objects resulting from electrical explosion. If employees use hair nets and/or beard nets, these items must be arc-rated.

- **Eye Protection.** Employees will wear protective eyewear whenever there is a danger of injury from electrical arcs or 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. Always wear eye protection (safety glasses or goggles) under face shields or hoods. The face shield must have an arc rating at least as great as the predicted incident energy or PPE category.
- **Hearing Protection.** Hearing protection will be worn when an employee is within the arc flash boundary to protect against the high noise potential from an electrical arc blast.
- **Body Protection.** When the calculated incident energy is below 1.2 cal/cm², all clothing must be non-melting or untreated natural fiber clothing (refer to section 1.04.10.n.(2), "Synthetic Clothing Not Permitted". Flash suits will be designed to permit easy and rapid removal. Garments, such as rain gear, worn as an outer layer over arc-rated clothing will also be made of arc-rated materials. The entire flash suit, including the arc hood and face shield, will have energy-absorbing characteristics suitable for arc-flash exposure.
- **Hand and Arm Protection.** Employees will wear rubber insulating gloves whenever there is a danger of hand and arm injury from electrical shock and burns because of contact with energized parts. Wear hand and arm protection when the possibility of arc flash burn exists. Gloves made from layers of arc-rated material provide the highest level of hand protection against arc flash. Heavy-duty leather gloves also provide good protection. When voltage-rated gloves are used, wear leather protectors over the rubber gloves.
- **Foot Protection.** Heavy-duty leather work shoes provide a significant degree of protection for the feet from arc flash. Shoes made from lightweight material will not be selected.

o. Protection Against Drowning

Provide U.S. Coast Guard (USCG)–approved, wearable personal flotation devices (PFDs) to employees when they are working on or around water that presents a drowning hazard. Employees will wear the provided devices as directed by the manufacturer's instructions (i.e., properly zipped, tied, latched, etc.). When USCG-approved 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.

- **Design.** The PFD will be of a highly visible color and will have at least 31 square inches (200 square centimeters) of retroreflective material attached to both the front and the

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back. If the PFD is reversible, retroreflective material will be attached to each of its reversible sides.

- **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, sun damage, and holes, and ensure that seams and fabric straps are in satisfactory condition. There must be no signs of waterlogging, mildew, or shrinkage of the buoyant materials. Metal or plastic hardware used to secure the PFD on the wearer must not be broken, deformed, or weakened by corrosion. Webbing or straps used to secure the PFD on the wearer must not be ripped, torn, or separated from an attachment point on the PFD. If any of the aforementioned defects or other defects identified in the manufacturer's instructions are found, do not use the PFD; replace it immediately.
- **Areas of Use.** PFDs shall be worn whenever there is a drowning hazard. This includes work on boats (unless in an enclosed cabin), rafts, floating pipelines, or stages and wading in streams/water that is waist deep or higher. PFDs shall be worn on structures or equipment next to or extending over water, except where guard rails, personal fall protection systems, or safety nets are provided for employees.
- **Ring Buoys.** Install USCG-approved ring buoys with at least 90 feet of line at 200-foot intervals along worksites where a drowning 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 immediately as needed.
- **Life Saving 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 must 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 (or two oars if the skiff is 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 for rescued persons, and
 - emergency lighting.

▲ RSHS Appendix A: Definitions

RSHS Appendix A ([Definitions](#)) is available to print at:

<https://www.usbr.gov/safety/rshs/index.html>.

▲ RSHS Appendix B: Additional References and Citations

RSHS Appendix B ([Additional References and Citations](#)) is available to print at:

<https://www.usbr.gov/safety/rshs/index.html>.