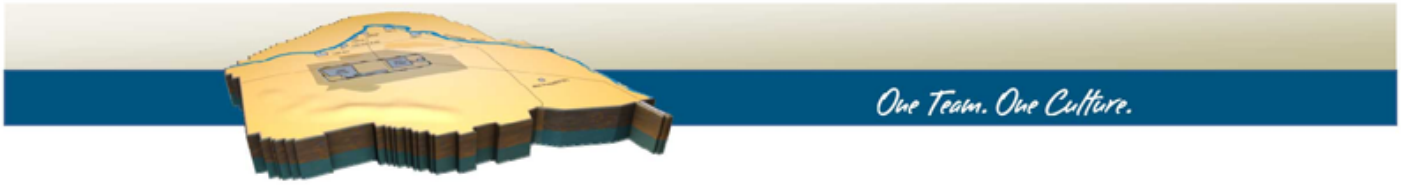

Standards

PRC-STD-SH-40518

Personal Protection

Revision 3, Change 2

Published: 11/18/2019
Effective: 11/18/2019

Program: Occupational Safety and Industrial Hygiene
Topic: Occupational Safety and Industrial Health

Technical Authority: Coffland, Katherine
Functional Manager: Seydel, Scott

Use Type: Administrative

- 100 K Facility :
  Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)
  Screener: Oberg, Brian
- 324 Facility :
  Categorical Exclusion: GCX-7 (Minor Change)
  Screener: Enghusen, Mark
- Canister Storage Building/Interim Storage Area :
  Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)
  Screener: Covey, Lori
- Central Plateau Surveillance and Maintenance :
  Categorical Exclusion: GCX-7 (Minor Change)
  Screener: Waller, Mitchell
- Plutonium Finishing Plant :
  Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)
  Screener: King, Jeffry
- Solid Waste Operations Complex :
  Screening Determination Performed: (GCX-8 (SWOC-13-004))

  Screener: Jacobs, Orvil
- Transportation :
  Excluded from USQ
  Exclusion Reason:
  N/A per Section 1.3.
- Waste Encapsulation Storage Facility :
  Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)
  Screener: Covey, Lori

JHA: Administrative
Periodic Review Due Date:05/22/2023
Rev. 3, Chg. 2

Change Summary

Description of Change

DOE-0359 Rev 4, effective 1/14/2019, implemented requirements in NFPA 70E-2018. "Arc-rated" terminology replaced "flame resistant" terminology to describe clothing that has been tested for an exposure to an electric arc, thus providing arc flash protection. Update records identification section. Delete 2.4 note.

Personal Protection

Published Date: 11/18/19 **Effective Date: 11/18/19**

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1.0 INTRODUCTION

1.1 Purpose

This procedure establishes requirements for protecting employees and visitors from injury due to absorption or physical contact hazards. Physical hazards are commonly associated with process or environmental conditions and may require engineering controls or protective equipment such as eye and face, head, foot, hand, electrical, and general clothing.

1.2 Scope

The requirements in this document are based upon 29 CFR 1910, *Occupational Safety and Health Standards,* Subpart I. This procedure does not cover the **Safety Shoes, Prescription Eyewear and Winter Clothing Purchase Policy** or personal protective equipment (PPE) requirements relating to respiratory protection, fall protection, hearing protection, radioactive contamination, hazardous waste site work, or electrical safety (except Arc-Rated [AR] clothing).

1.3 Applicability

This procedure is applicable to CHPRC Team employees and subcontractor personnel involved with the CHPRC work scope.

1.4 Implementation

This procedure is effective upon publication.

2.0 STANDARD

2.1 General Protection

Safety glasses with side protection, substantial footwear, long pants, and shirts with sleeves that cover the shoulder shall be worn as the minimum PPE dress code for all work environments, excluding administrative office work.

Work areas or activities that necessitate a reduction in the minimum PPE requirements shall be performed using a documented hazard assessment approved by the Project Vice President (or delegate) and Occupational Safety and Industrial Hygiene (OS&IH) Manager and submitted to the PPE Technical Authority (TA). Reduction of minimum PPE will be reviewed and approved on an annual basis.

Facility, area, and job-specific PPE requirements shall be communicated to employees, as well as visiting personnel and outside visitors and subcontractors. PPE may be employee-provided, but must meet or exceed the requirements of this document.

Defective/damaged PPE shall be immediately removed from service. Reusable safety equipment should be maintained in a clean and sanitary condition, and stored in such a manner as to provide protection from damage and accumulation of dust and dirt.

Employees shall dress for the nature of their work assignments, exposure to the general work environment, and expected climatic conditions. Long hair shall be restrained and loose-fit clothing is prohibited around moving machinery.

Protective equipment must be approved by a recognized standards agency (e.g., American National Standards Institute [ANSI]).

NOTE: *Minimum PPE requirements do not apply when moving from one location to another (e.g., when leaving a step off pad after doffing anti-contamination clothing).*

2.2 PPE Hazard Assessment

The minimum PPE described in section 2.1 above may need to be supplemented or substituted depending upon specific workplace conditions. In these cases, a documented hazard assessment of work areas or of tasks within a particular work area will be completed where hazardous conditions may be present that require PPE changes to the minimum PPE. The hazard assessment should include:

- Building location or workplace area
- Work package number, if applicable
- Name of assessor(s)
- Date(s) of the assessment
- PPE needed for the hazards discovered

The hazard assessment may be completed through PRC-PRO-WKM-079, Job Hazard Analysis; the project Health and Safety Plan; the PPE hazard assessment form (A-6007-536); or through the Contractor Safety Process, PRC-PRO-SH-40078, Appendix H; Job Hazard Analysis Process for Subcontractors.

The hazard assessment shall be revised if hazard conditions of the work area change causing an upgrade or downgrade of PPE, such as a change in footwear or the addition of chemical goggles or face shield with safety glasses.

NOTE: *The Job Hazard Analysis Process for Subcontractors shall be in compliance with this Standard for approving changes to PPE requirements.*

A reassessment for workplace hazards will be completed based on the planned startup of new processes or equipment, change in hazardous material usage, and when trend analysis identifies a pattern in PPE-related accidents/incidents; including non-usage of required PPE.

Ensure chemical and heat stress considerations are considered as part of the PPE selection.

2.3 Head Protection

Employees will be provided and required to use protective headgear conforming to the specifications of ANSI/International Safety Equipment Association (ISEA) Z89.1, *American National Standard for Industrial Head Protection*, when working in areas where there is a potential danger of head injury due to the hazards of falling or flying objects, or electrical shock or burns.

"Bump caps" may be worn only in areas where a PPE hazard assessment verifies that head hazards are limited to "striking one's head against fixed, low-clearance objects," with no potential for injury to the head caused by electrical contact or from falling or flying objects (e.g., impact).

Head protection shall be inspected before each use. Shells shall be inspected for signs of dents, cracks, penetration, and any damage due to impact, rough treatment, or wear; inner suspension liners should be inspected closely for cracks or tears, frayed or cut straps, loss of pliability, or other signs of wear.

- Immediately replace the hard hat if the cap has been struck by a forcible blow of any significant magnitude, even if no damage is visible.
- The use of hard hat stickers may degrade the hard, plastic shell due to the chemicals contained in the adhesive. Some manufacturers prohibit the use of foil stickers due to the potential of conductivity. While the use of stickers and decals is permitted, manufacturer's recommendations must be followed. When allowed by the manufacturer, stickers should be placed at least three-fourths of an inch away from the edge of the hard hat to reduce the risk of the decal acting as a conductor between the inside and outside of the helmet. Stickers and decals should be kept to a minimum to allow for regular inspection of the helmet shell for signs of damage due to use or aging.

Field test shall be performed, in accordance with manufacturers' recommendations, to determine possible degradation of polyethylene shells:

- The manufacturer's recommendations shall be implemented for service life of the hard hat shell and suspension. The average life span is 3 to 5 years.

NOTE: *The Type I provides protection against impact to the top of the shell; Class C does not provide protection against contact with electrical hazards; Class G or E provides general purpose and electrical insulating properties.*

CHPRC employees shall use the minimum headgear: Type I, Class C, E, or G hardhat, depending on work activities.

2.4 Hand Protection

Selection of the proper glove, tool, or guarding device to protect the user will be considered when working around chemical, cut, or puncture hazards. Where multiple hazards are present, each hazard must be evaluated to determine which have the higher priorities.

- Selection of the type of hand protection is based on published product performance characteristics, degree of dexterity required to perform the work/task, and protection factor against the hazard(s) identified. REQUIRE cut or puncture resistant gloves whenever cut or puncture hazards are associated with the task.
- REQUIRE protective gloves whenever abrasion hazards are associated with the task.

NOTE *Examples of cut and puncture resistant gloves are provided on the OS&IH PPE Webpage.*

- OS&IH shall perform a chemical evaluation whenever chemicals or hazardous materials are being used.
- REQUIRE chemical protective gloves and/or gauntlets when product or waste hazards are present.

2.5 High Visibility

Employees who work near roadway traffic work zones, high traffic areas, or around heavy equipment shall be provided with, and wear, high-visibility garments as required by the hazard analysis.

High visibility garments worn by personnel working near highway traffic traveling in excess of 50 mph or in low light conditions must meet the requirements of an ANSI Class 3 Vest.

High-visibility garments that become faded, torn, soiled, worn, or defaced (reducing the equipment's performance) shall be removed from service and replaced.

2.6 Eye Protection

The minimum acceptable form of eye protection is safety glasses with side protection that meet the requirements specified in the ANSI/ISEA Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*. For the purpose of this Standard, wrap-around side pieces are considered as side protection.

- Each affected employee shall use eye or face protection appropriate for the work activities when exposed to flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.
- Each affected employee engaged in welding activities shall use equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation (see Appendix A).
- Prescription safety eye protection shall be ANSI/ISEA Z87.1 compliant and be fitted with side protection (i.e., Side-Shields or Wrap-Around Style Protection).

Additional ANSI/ISEA-Z87.1 eye and/or face protection (e.g., face shields), will be provided and shall be worn, as required by the hazard analysis per Section 2.2 above.

Dark tinted glasses may not be worn inside of buildings, offices, facilities or enclosures, except under written medical prescription and in cases where the blockage of visible light does not create a greater hazard by impeding vision. Light tinted safety glasses (Amber/Yellow) are authorized for use indoors.

Safety glasses are not required when wearing full-face respirators, including full-face powered air purifying respirators (PAPR). Safety glasses ARE required to be worn when wearing PAPRs with hoods.

2.7 Foot Protection

Substantial footwear is the minimum requirement for field work, excluding administrative office areas. Prescribing different footwear is allowed, but must be identified per the hazard analysis as described in Section 2.2. The following footwear is prohibited from all work areas: toning shoes (e.g., Shape-Ups™), open recoil shoes (e.g., Z-coil™), flip flops, moccasins, slippers, or other soft-soled shoes.

Footwear that has deteriorated to a point where the designed protective features have diminished is unacceptable.

2.7.1 Administrative Areas

General footwear are shoes that provide minimal foot protection. High-heel or open-toed shoes are only acceptable in an office or classroom environment, (e.g., 825 Jadwin), or other areas deemed “administrative” by the responsible Vice President. Additional consideration should be made in the PPE analysis for locations, such as outside staging or parking areas, that may have uneven surfaces or in gravel.

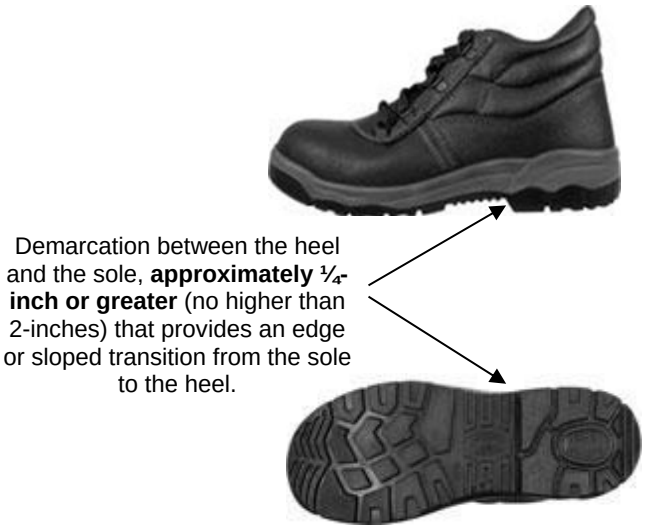
2.7.2 Field Operations

The following explains the two levels of footwear for field work: Substantial and Protective.

2.7.2.1 Substantial

Substantial footwear is made of sturdy construction that fully encloses the foot, has a semi-rigid non-slip sole (i.e., gripping traction pattern), and a defined heel. Depending on work location/environmental conditions, substantial footwear may need to have appropriate ankle support. This should be captured in the applicable hazard analysis. A defined heel is a distinguishable, demarcation between the heel and the sole, approximately ¼-inch or greater (no higher than 2-inches) that provides an edge or sloped transition from the sole to the heel.

Figure 1 – Example of a Defined Heel



2.7.2.2 Protective

Protective footwear is that which has a protective steel or composite toe and a defined heel. Protective footwear is required for construction and/or demolition-related work activities or when there is a potential exposure to the foot from falling or rolling objects or penetrating materials.

- The steel or composite toe must meet specifications in the American Society of Testing Material (ASTM) International Standard F2413-05, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*. Add-on protective devices (e.g., strap-on toe, foot, or metatarsal guards) may be used as a substitute for (ASTM) F2413-05, where such devices provide protection equivalent to the ANSI (Z41-1991, Z41-1999) performance standards. For further information, see Appendix B.

Exceptions to these rules must be captured and approved as part of a hazard assessment.

2.8 Arc-Rated (AR) Clothing

Arc-Rated (AR) clothing is to be worn during work activities that have the potential to expose workers to an arc flash. Appendix E describes the procurement process for CHPRC employees. AR clothing shall meet the requirements in DOE-0359, *Hanford Site Electrical Safety Program.* DOE-0359 requires compliance with NFPA 70E, *Standard for Electrical Safety in the Workplace.*

AR Clothing used for welding and cutting may be different than what is listed in Appendix E. Specific clothing may be needed which provides additional protection for these operations.

2.9 Training

General PPE training is provided in the Hanford General Employee Training under Personal Safety and refreshed on an annual basis.

3.0 FORMS

None

4.0 RECORD IDENTIFICATION

None

5.0 SOURCES

5.1 Requirements

10 CFR 851, *Worker Safety and Health Program*
29 CFR 1910, *Occupational Safety and Health Standards*
29 CFR 1926, *Safety and Health Regulations for Construction*
ASTM F2413-05, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*
ANSI/ISEA 105-2005, *Hand Protection Selection Criteria*
ANSI/ISEA Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*
ANSI/ISEA Z89.1, *American National Standard for Industrial Head Protection*
Bennett Safety wear EN 388, *Protective gloves against mechanical risks*
DOE-0359, *Hanford Site Electrical Safety Program*
Federal Highway Administration*, Manual on Uniform Traffic Control Devices,* 2009
NFPA 70E, *Standard for Electrical Safety in the Workplace*
Public Law 91-596, *Occupational Safety and Health Act of 1970* (General Duty Clause)

5.2 References

ASTM F739, *Standard Test Method for Permeation of Liquids and Gases through Protective Clothing Materials under Conditions of Continuous Contact*
PRC-PRO-SH-40078, *Contractor Safety Processes*
PRC-PRO-WKM-079, *Job Hazard Analysis*
PRC-PRO-IRM-10588, *Records Management Processes*
PRC-PRO-QA-19579, *OCRWM Records Management*

Appendix A - Safety Eyewear (Safety Glasses)

It is a CHPRC safety requirement that appropriate eye protection be provided to and worn by employees whose work activities expose them to eye hazards, or where eye protection use is otherwise designated. Eye protection shall meet the requirements specified in the American National Standards Institute /International Safety Equipment Association (ANSI/ISEA) Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*.

Protective eyewear shall conform to the criteria specified by ANSI/ISEA Z87.1, and be marked to indicate the impact resistance level. The BASIC IMPACT level marking is "Z87" or "Z87-2"; the HIGH IMPACT level marking includes a "+" mark/sign.

For exposure to high impact hazards, the selection and use of a HIGH IMPACT frame and lens is the standard of choice.

Ordinary prescription eyewear does not provide adequate protection from injury to the eyes from impact hazards and does not meet ANSI/ISEA Z87.1 eye protection specifications; therefore, it is the policy of CHPRC to provide protective prescription eyewear with side protection (i.e., side shields or wrap around style) to qualified active employees who need corrective lenses for vision, and whose job routinely requires the use of safety eyewear for protection.

Where prescription lenses are needed to enhance/correct vision and exposure to eye hazards exist, employees may use ANSI-approved protective eyewear that incorporates the prescription in its design or use eye protection that can be effectively worn over the prescription lenses. Contact lenses may be worn for vision correction, but are not a substitute for eye protective devices and appropriate industrial safety eyewear.

To ensure worker protection, an employee may be issued non-prescription safety eyewear for use over top of their regular street-wear prescription glasses until prescription safety glasses are ordered and received.

Transition lenses may be worn, but only for employees who do not operate equipment between indoor and outdoor locations or who are not otherwise involved in activities requiring critical acuity (fast reaction to visual stimuli).

The rate at which it takes a tint change to occur in transition lenses is not instantaneous (e.g., it may take a minute for the fading process to occur) and may present a hazard to workers moving from outdoor light to areas of lower illumination (e.g., indoors).

Light tinted safety glasses are authorized for use indoors.

Indoor/outdoor glasses that meet the ANSI/ISEA standard are acceptable.

Non-transitional, dark tinted glasses may not be worn inside of buildings, offices, facilities, or enclosures - except under written medical prescription and in cases where the blockage of visible light does not create a greater hazard by impeding vision.

Appendix A – (Cont.)

Protective eyewear equipment shall be reasonably comfortable to wear, fit snugly without interfering with the movements or vision of the wearer, and is not modified from original manufactured condition.

Full-face respirators present a unique situation for employees who need prescription glasses. The use of respirator brand and model specific National Institute for Occupational Safety and Health (NIOSH)-approved glasses and mounts inside the face piece of the respirator are required. The ordering of custom prescription optical inserts that are manufacturer and NIOSH approved with the respirator will be ordered from the authorized Material Coordinator. Be sure to specify the brand and model for the tight fitting respirator to be worn since eyeglass may not be swapped between different models and brands of respirators. When an employee must wear optical inserts as part of the face piece, the face piece and lenses shall be worn during fit testing of the tight fitting respirator in which they are to be worn.

Tips for Proper Care of Safety Glasses:

1. Rinse lenses with water before wiping or cleaning, as fine dirt can scratch the surface.

NOTE: *Lenses may be scratch-resistant, but are not scratch-proof!*

Ammonia-based cleaners (e.g., Windex) can damage lens coatings.

Do not use paper products as lens wipes; they are usually abrasive.

Avoid handling the glasses when not in use to maintain them in proper adjustment.

Store the eyeglasses in a protective case when not in use to prevent accidental damage.

Guide for Welding Shade Numbers, Source: ANSI Z49.1:2012

PROCESS	ELECTRODE SIZE (in mm)	ARC CURRENT (Amperage)	MINIMUM PROTECTIVE SHADE	SUGGESTED SHADE NO. (Comfort)*
Shielded Metal Arc Welding (SMAW)	Less than 3/32 (2.4) 3/32-5/32 (2.4-4.0) 5/32-1/4 (4.0-6.4) More than ¼ (6.4)	Less than 60 60-160 160-250 250-550	7 8 10 11	- 10 12 14
Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW)		Less than 60 60-160 160-250 250-500	7 10 10 10	- 11 12 14
Gas Tungsten Arc Welding (GTAW)		Less than 50 50-150 150-500	8 8 10	10 12 14
Air Carbon Arc (Light) Cutting (CAC-A) (Heavy)		Less than 500 500-1000	10 11	12 14
Plasma Arc Welding (PAW)		Less than 20 20-100 100-400 400-800	6 8 10 11	6 to 8 10 12 14

Appendix A – (Cont.)

PROCESS	ELECTRODE SIZE (in mm)	ARC CURRENT (Amperage)	MINIMUM PROTECTIVE SHADE	SUGGESTED SHADE NO. (Comfort)*
Plasma Arc Cutting (PAC)		Less than 20 20-40 40-60 60-80 80-300 300-400 400-800	4 5 6 8 8 9 10	4 5 7 8 9 12 14
Torch Brazing (TB)		-	-	3 or 4
Torch Soldering (TS)		-	-	2
Carbon Arc Welding (CAW)		-	-	14
	Plate Thickness **In.**	**mm**		**SUGGESTED SHADE NO. (Comfort)***
Oxyfuel Gas Welding (OFW) Light Medium Heavy	Under 1/8 1/8 to ½ Over ½	Under 3 3 to 13 Over 13		4 or 5 5 or 6 6 or 8
Oxygen Cutting (OC) Light Medium Heavy	Under 1 1 to 6 Over 6	Under 25 25 to 150 Over 150		3 or 4 4 or 5 5 or 6

Appendix B - Protective Footwear (Safety Shoes/Boots)

It is a CHPRC safety requirement that protective footwear be provided to and worn by employees whose work activities expose them to the risk of foot injury during the course of their duties. Protective footwear shall be composed of leather or equivalent, have a defined heel, and meet one or more of the following Foot Protection Code requirements; American Society of Testing Material (ASTM) International Standard F2413-05, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear.*

The ASTM F2413-05 standard covers minimum requirements for the design, performance, testing, and classification of protective footwear. Footwear certified as meeting ASTM F2413-05 must first meet the requirements found in the ASTM document in Section 5.1, "Impact Resistant Footwear," and Section 5.2, "Compression Resistant Footwear." Then the requirements of additional sections such as metatarsal protection, conductive protection, electric shock protection, static dissipative protection, and protection against punctures can be met.

Protective footwear can meet all the requirements of the ASTM standard or only specific elements of it, as long as it first meets the requirements for impact and compression resistance. All footwear manufactured to the ASTM specification must be marked with the specific portion of the standard with which it complies. One shoe of each pair must be clearly and legibly marked (stitched in, stamped on, pressure sensitive label, etc.) on either the surface of the tongue, gusset, shaft, or quarter lining.

EXAMPLE: The following are examples of ASTM code inscriptions that may be found on a piece of protective footwear:

- ASTM F2413-05
- F I/75/C/75/Mt75
- PR
- CS

Line #1: ASTM F2413-05. This line identifies the ASTM standard. It indicates that the protective footwear meets the performance requirements of ASTM F2413 issued in 2005.

Line #2: F I/75 C/75 Mt/75. This line identifies the applicable gender (M or F; here it is F) for which the footwear is intended. It also identifies the existence of impact (I) resistance, the impact resistance rating (75 foot-pounds), and compression (C) resistance (of 75 or 50 which correlate to 2500 pounds and 1750 pounds of compression, respectively). This line can also include a metatarsal (Mt) protection designation and rating (75 foot-pounds).

Lines #3 & 4: PR & CS. These lines are used to identify footwear made to offer protection from other specific types of hazards referenced in the standard. They are used to designate conductive (Cd) properties, electrical insulation properties (EH), footwear designed to reduce the accumulation of excess static electricity (SD), puncture resistance (PR), chain saw (CS) cut resistance, and dielectric insulation (DI), if applicable.

Safety shoes/boots can be requested and answers can be obtained by contacting the authorized Material Coordinator P-Card Holder representing the requesting employee's organization.

Appendix C - Examples of Acceptable Hard Hat Accessories

Picture	Item	Picture	Item
	Winter liner with neck protection		Winter liner with neck protection
	Winter liner		Tight fitting knit cap liner
	Do-rag/skull cap		Skull cap
	Full face stretch tube winter liner		Balaclava

Appendix C – (Cont.)

Most tight-fitting fabric stocking caps (skullcaps, weld caps, winter liners, etc.) are acceptable providing that:

- The garment does not contain any metal parts or pieces.
- The garment is located below the suspension ribbons (between the user's head and the hat's suspension).
- The garment fits smoothly on the head.
- The hard hat will remain on the head with the suspension adjusted snugly.

Protective accessories such as hard hat liners, zero hoods, welder's caps, kerchiefs, and those designed by the hard hat manufacturer, to work in conjunction with the hard hat suspension, are acceptable. Baseball caps, hoodies, and similar bulky headdress are not allowed.

Protective headgear shall not be altered in any way and must be worn as designed, ensuring nothing interferes with fit or stability or interferes with the air gap existing between the hard hat suspension and shell.

Appendix D - Chemical Protective Clothing Guidance

The selection of the appropriate chemical protective clothing (CPC) should always be preceded by an accurate hazard analysis or assessment. The hazard assessment will be the basis used in selecting the fabric, design, and method of construction. If the worker is not adequately protected from the chemical hazards found in the workplace, chemical exposure or injury may occur. Conversely, overprotection of the worker can add undue heat burden and restrict mobility causing increased physical exertion.

The hazard assessment should include, at a minimum, the following:

- Task being performed
- Duration of work activity in CPC
- Chemical exposure potential (concentration, amount, duration)
- Past performance: Has the task been performed in the past and if so, what CPC was used? Was it adequate?
- Potential damage to garment by work activity
- Single or multiple chemical exposure
- List of chemical hazards present
- State of the chemical (solid, liquid, gas) at working temperatures
- Chemical exposure hazard (inhalation or skin contact)
- Chemical(s) type: corrosive, irritant, sensitizer, carcinogen
- Effects acute/chronic
- Warning properties (signs/symptoms of exposure)
- Temperature extremes for activity
- Potential fire hazard or hot surface contact

The hazard analysis or assessment should be documented in or attached to the applicable Job Hazard Analysis document. This documentation provides the rationale for the clothing material selected.

Appendix D – (Cont.)

CPC Selection

Since there is currently no comprehensive US standard for evaluating the performance of CPC, this responsibility falls to the industrial hygienist. The primary factors important to the development of selection criteria for CPC include:

- *Clothing integrity* - the ability of the CPC to prevent penetration or permeation by a chemical
- *Material barrier* - the effectiveness of the material and seams used in the suit construction
- *Physical durability* - the resistance to physical hazards such as, abrasion, cutting, punctures, and tears
- *Decontamination* - the ease of removal of contaminants from the suit
- *Impact on worker* – the effect on function, mobility, and comfort

The selection of the CPC for a specific activity will largely be dependent on the chemical hazard and the nature of the hazard. Manufacturers of CPC provide a wide range of materials with varying resistance to selected chemicals. Prior to selecting a CPC ensemble, the industrial hygienist should review the manufacturer's specifications to ensure it is adequately protective to the worker. CPC manufacturers provide breakthrough times for liquid/vapor chemicals for their suit materials. Breakthrough times should be of sufficient duration to complete the work activity.

For particulate hazards that pose a skin contact risk, the CPC should provide sufficient protection from particulate penetration to protect the worker. The industrial hygienist should also be aware that the use of personal clothing under CPC can present an additional risk to family members if taken offsite with the worker at the end of the shift. If personal clothing instead of company-supplied modesty clothing is used, the CPC selected should be sufficiently protective to prevent hazardous materials from being taken offsite on the employee's personal clothing.

Consideration in the selection of CPC should be given to the manufacturing process. How the seams are constructed can play a significant role in the selection process. For particulate applications where the chemical hazard is minimal, sewn seams may be adequate if company-supplied modesty clothing is used. For more toxic particulates where a skin exposure presents a risk to the worker or for use with some liquid, chemical bonded seams provides more protection against penetration through the seams. For maximum seam penetration resistance, heat-sealed or double heat-sealed seams should be used.

Appendix E - Arc-Rated Clothing

Arc-rated (AR) clothing shall meet the requirements in DOE-0359, *Hanford Site Electrical Safety Program*. DOE-0359 requires compliance with NFPA 70E, *Standard for Electrical Safety in the Workplace*. AR clothing shall be worn by employees whom have the potential to be exposed to an arc flash during work activities. AR clothing must be the outer layer of clothing. Flame resistant clothing for welding and cutting may be different than arc-rated clothing and should be specific for the tasks involved.

The procurement process for AR clothing for CHPRC employees is as follows:

Employees requiring daily use AR clothing will receive clothing through a lease program with a vendor. The clothing will be appropriate for Arc-Flash PPE Category 2 with an arc rating of 8 cal/cm^2. The number of sets per employee will be dependent on required use, work schedule and job category, i.e., Electricians on 4x10's are eligible for up to eight sets, and FWS are eligible for two sets. The actual number of sets per employee (not to exceed eight) will be determined by their managers and included in the Statement of Work (SOW).

Employees requiring intermittent use AR clothing will receive clothing through a lease program with a vendor. The clothing will be appropriate for Arc-Flash PPE Category 2 with an arc rating of 8 cal/cm^2. The number of sets per employee will be dependent on required use and job category, i.e., Instrument Technicians, Stationary Operating Engineers and respective Field Work Supervisors, are eligible for up to two sets of clothing. The actual number of sets per employee will be determined by their managers and included in the SOW.

Employees requiring AR winter wear will receive clothing through a lease program with a vendor. The clothing will be appropriate for Arc-Flash PPE Category 2 with an arc rating of 8 cal/cm^2. The clothing required will be dependent on required use. The actual clothing items will be determined by their managers and included in the SOW.

The lease program will include laundry services.

A set of daily wear consists of:
- Long sleeve shirt and long pants, or
- Coveralls.

A set of winter wear consists of a combination of:
- Zip-up hooded sweatshirt
- Insulated coat
- Insulated bib overalls

The Project Buyer's Technical Representative (BTR) for the SOW will maintain a list of employees and the approved number of sets per employee for each Project. This list will be shared with the Contract Specialist and the vendor. This list will be updated with employee changes and clothing returns. All leased AR clothing must be returned if employee leaves CHPRC. Clothing shall be returned per the SOW to the MSA Point of Contact, not placed in the laundry.

Project specific or Work Package specific items for higher hazard risk category activities may be purchased by the Project with Vice President approval. These items will be assigned to the Project, not individuals. This includes flame resistant anti-contamination clothing used in radiological areas.