

CONTRA COSTA WATER DISTRICT
PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM

June 2006

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1.0 INTRODUCTION

1.1 Purpose

This Personal Protective Equipment (PPE) Program outlines the procedures, practices and requirements for the personal protection of workers exposed to hazards not otherwise controlled by engineering or administrative methods.

1.2 Scope

This program applies to all Contra Costa Water District (“District”) and contract personnel and complies with the California Code of Regulations Title 8, “General Industry Safety Orders,” Article 10, “Personal Safety Devices and Safeguards.”

2.0 HAZARD ASSESSMENT

An assessment of the workplace must be conducted by the employee, supervisor, and/or safety officer to determine the hazards that are present, or are likely to be present, which necessitate the use of PPE. The assessment must be in writing and used to:

- Identify the hazards
- Select appropriate PPE
- Communicate the selection decisions to each affected employee

The assessment can be conducted by using the Hazard Assessment Checklist (Appendix C) or by conducting a job safety analysis.

2.1 Job Safety Analysis

Job Safety Analysis (JSA) is a simple technique to help identify hazards that are associated with a job or operation and the methods and equipment used to protect against the hazards. The JSA uses a four step process that involves the following:

- Select the job to be analyzed
- Break the job down into the basic step
- Identify the existing and potential hazards
- Develop corrective measures/protection for the hazards

2.1.1 Instructions For Completing Job Safety Analysis Form

Using the form provided in Appendix D, selecting the job/operation to be analyzed.

1. Break the job down into steps. The step will consist of a set of movements. Look at the first set of movements used to perform a step, and then determine the next logical set of movements. Be sure to list all the steps in the job. Some steps may not be done each time. However, a step that is part of a job as a whole should be listed and analyzed.
2. Examine each step to find and identify hazards, actions, conditions and possibilities that could lead to an accident. It is not enough to look at the obvious hazards; be sure to look at the entire work environment and discover every conceivable hazard that may exist. Be sure to list health hazards as well, even though the harmful effect may not be immediate.
3. Using the first two columns as a guide, decide what measures are necessary to eliminate or minimize the hazard that could lead to an accident, injury, or occupational illness. Give a recommended corrective measure for every hazard.

Among the corrective measures that could be taken are: A) engineer the hazard out; B) provide PPE; C) job instruction training; D) good housekeeping; and E) good ergonomics. Be specific. Say exactly what needs to be done to correct the hazard.

An example on how to fill out a JSA is provided below:

EXAMPLE

JOB SAFETY ANALYSIS		JOB OR OPERATION TITLE Drill Press Operation
DEPARTMENT/DIVISION Fabrication	JOB LOCATION Drill Press #1	TITLE OF EMPLOYEE DOING JOB Drill Press Operator
DATE PERFORMED 9-9-97	PERFORMED BY Joe Billings	VERIFIED BY Frank Culberson
SPECIAL OR PRIMARY HAZARDS Hand/Eye Injuries, Repetitive Motion		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED OR RECOMMENDED Heavy Gloves, Eye Protection		
BASIC JOB STEPS	EXISTING and POTENTIAL HAZARDS	RECOMMENDED CORRECTIVE MEASURES
1. Transfer undrilled plate from basket to drill press.	1A. Cuts from sharp edges or burrs. 1B. Foot injuries from dropping wet slippery stock. 1C. Illness from absorbing or inhaling degreasing solvent. 1D. Repetitive motion/awkward position.	1A1. Require cut-proof gloves. 1B1. Require safety shoes. 1B2. Require slip-proof gloves. 1C1. Require solvent-proof gloves. 1C2. Require solvent-proof apron. 1C3. Require respirator. 1C4. Change to non-toxic solvent. 1D1. Reposition and raise basket.
2. Drill plate.	2A. Cut or bruise from unsecured stock. 2B. Cut, burn, eye injury from shavings. 2C. Cut, burn, bruise from contact with drill bit. 2D. Cut, burn, bruise, eye injury from broken drill bit. 2E. Illness from inhalation of heated solvent vapors. 2F. Fatigue from standing on concrete floor. 2G. Slip or fall from solvent on floor. 2H. Eye strain from insufficient light. 2I. CTD from repeatedly turning crank.	2A1. Install clamp. 2B1. Require cut-proof gloves. 2B2. Require eye protection. 2C1. Required protective gloves. 2D1. Install guard around bit at point of operation. 2D2. Require eye protection. 2E1. Install ventilation to disperse vapors. 2E2. Require respirator. 2E3. Change to non-toxic solvent. 2F1. Install cushioning floor mat. 2G1. Install slip-proof mat or floor surface. 2G2. Required slip-proof safety shoes. 2H1. Install better lighting at work station. 2I1. Install push-button or foot pedal to activate drill.
3. Transfer drilled plate to finished parts bin.	3A. Cuts from sharp edges and burrs. 3B. Foot injuries from dropping wet, slippery stock. 3C. Repetitive motion/awkward position.	3A1. Required protective gloves. 3B1. Required safety shoes. 3B2. Require slip-proof gloves. 3C1. Reposition and elevate parts bin.

3.0 PERSONAL PROTECTIVE EQUIPMENT

3.1 General

Personal protective equipment must be utilized in strict adherence to the District Health & Safety Manual. Any exceptions to the use, type, location, or non-use of personal protective equipment must be determined by the Safety Officer.

3.2 Eye and Face Protection

All employees must wear approved eye and/or face protection at all times when operating machinery or performing any operation where an exposure to eye or face injury from flying particles, splashed liquids, hazardous materials, or injurious light rays exists.

Approved impact goggles and/or face shields are required during operation of jack hammers, chippers, chain saws, grinders, root cutters, concrete saws, lawn edgers, spade hammers, impact devices, and powder-activated tools.

Eye/Face protection is required to be worn at treatment plant chemical process areas, laboratories, maintenance shops, and all other areas where there are unshielded pressurized hazardous chemical lines or when hazardous chemicals are being used. Eye/face protection is also required in the immediate areas where construction and maintenance activities are being performed except during operation of motorized equipment while inside an enclosed cab.

Wearing of eye/face protection is not required during the following activities:

- a. Meter and backflow device installation duties or other meter technician and cross connection duties not located in the immediate area of construction maintenance activities nor where an exposure to eye or face injury from flying particles, splashed liquids, hazardous materials, or injurious light rays exists.
- b. Operation of motorized equipment while inside an enclosed cab.

Approved eye protection is required for those employees wearing corrective lenses. Approved eye protection devices are:

- Safety glasses
- Impact goggles
- Impact face shield with safety glasses

Those work locations, as identified by the Supervisor, Safety Officer or Site Committee, where eye and/or face protection is required must be so posted. Eye and face protective devices must be provided by the District.

3.2.1 Prescription Safety Glass Program

Employees must be provided prescription safety glasses when job duties require eye protection. Non-prescription safety glasses are available in District Stores.

Employees in the job classes identified in Appendix A are eligible to participate in the District's prescription safety glasses program.

1. Employees in the identified job classes must be entitled to one pair of prescription safety glasses every two (2) years.
2. Prescription safety glasses must be provided by the District at no expense to employees identified in the above job classifications list.
3. Employees are responsible for obtaining an eye exam for the purpose of establishing their prescription. Any associated costs for the eye exam must rest with the employee.
4. Prescription safety glasses may be replaced prior to the two (2) year provision under the following circumstances:
 - Glasses damaged other than by employee negligence;
 - Lost due to vandalized District vehicle;
 - Change in prescription.
5. The District must identify a vendor for purposes of providing prescription safety glasses for employees in the affected job classes.
6. The Safety Officer will provide a list of eligible employees to the identified vendor.
7. Affected employees must obtain their prescription and present the prescription to the selected safety glasses vendor.
8. Upon arrival, the selected vendor must verify that the employee is on the eligibility list.
9. A vendor will be provided in the Antioch and Concord areas.
10. Special adaptive devices for self-contained breathing apparatus will also be provided by the District.
11. Visits to the safety glass vendor must be on District time and expense.
12. Safety glass options must include (1) photogrey, (2) "no-line" or progressive lenses, and (3) single vision.

3.3 Safety Footwear

Approved foot protection must be purchased and worn by employees who are exposed to potential foot injuries from hot material, corrosive substances, falling objects, and crushing or penetrating activities. Employees who are required by the District to wear safety shoes must receive a yearly allowance to assist in purchasing approved safety shoes.

3.3.1 Safety Shoe Program

1. The Safety Officer will review job classifications to determine which employees are required to wear safety shoes.
2. All safety shoes must comply with the American National Standards Institute (ANSI) Z-41 standard;
3. Wear safety shoes/boots that comply with ANSI Z-41 when exposed to foot injuries from hot material, corrosive substances, falling objects, and crushing or penetrating activities. When applicable, employees shall follow union contract (Memorandum of Understanding) requirements to wear safety shoes/boots during all working hours.
4. The District must provide an allowance yearly to each employee required to wear safety shoes, to assist with the purchase of District-approved safety shoes;
5. Employees may purchase safety shoes, consistent with District requirements, from District-approved shoe mobiles or from a store of their choice;
6. The District safety shoe allowance must be applied toward the purchase of safety shoes that meet District requirements.

3.4 Head Protection

District must provide approved head protection devices for all employees, including volunteers and visitors, for the following types of conditions:

1. Overhead hazards or ground level moving objects;
2. In construction zones;
3. Exposure to flying or falling objects (electric work requires a non-conductive head protection device);
4. Exposure to electric shock or burns;
5. A risk of injury from hair entanglement with moving machinery, combustible material, or toxic contaminants exists. Employees so affected must confine their hair to eliminate the hazard;
6. Water utility line maintenance and installation;

7. Roadway repair including curbs, gutters, and sidewalks.

Hard hats must be worn at all times when the following conditions are present:

At work sites where construction and maintenance activities are conducted.

2. When working on a public street for greater visibility.
3. In the immediate areas where maintenance activities are performed, where potential hazards exist for head-bumps/abrasions, flying debris from the use of tools, falling objects, and other hazardous energies. Specifically, hard hats are worn:
 - a. At all work sites where heavy equipment (crane, hoist, backhoe, front-end loader, etc.) is being operated.
 - b. At all work sites where a dump truck is being loaded or unloaded.
 - c. In an excavation greater than 3 feet in depth.
 - d. At all work sites where powered tools are used including pavement breakers, weed eaters, and powered saws.
 - e. When performing maintenance activities at treatment plants, pump stations/plants, and along canals.
 - f. When vertically entering/exiting permit-required confined spaces.
 - g. When working on energized electrical parts (more than 50 volts).

Wearing of hard hats is not required during the following activities:

- a. Meter and backflow device work, engineering technician duties, and field customer service duties not located on a public street, in the immediate area of construction maintenance activities, or where powered tools are used.
- b. Field customer service workers crossing public streets at intersection corners, obeying traffic signals and rules.
- c. Maintenance work in occupied office areas and grounds maintenance duties where powered tools or equipment are not used and no overhead work is being performed.
- d. Treatment plant operator work not in the immediate area of construction or maintenance activities.
- e. Work in maintenance shops when cranes are not in use or when not working on energized electrical parts/systems.
- f. Operation of motorized equipment while inside an enclosed cab, and operation of forklifts at Stores.

Supervisors are responsible to ensure the type of hard hat is properly suited for the assigned work. If the hard hat restricts an employee's ability to safely perform work, or exposes the employee to an unsafe working condition, the supervisor shall provide and direct the employee to wear hard hat protection that is suitable to the assigned work.

Interior areas of buildings requiring head protection must be so posted. District will provide approved head protection device in accordance with applicable state law.

3.5 Hand Protection

Approved hand protection must be worn by all employees who are exposed to hazardous substances, burns, cuts, punctures, or other hazards that may be present in the performance of their job duties. Hand protection devices must be provided by the District to employees and are available through Stores at the corporation yard.

Superintendents/supervisors are responsible for providing hand protection to their employees which is appropriate for the exposure. Refer to the glove selection guide (Appendix F) or the District Safety Officer for any questions regarding the proper type and/or use of hand protection

3.6 Body Protection

The District must provide full body protection when exposures present a threat to the torso. Protection of this type includes chemical suits, aprons, coveralls, rain gear, and welding protection. The appropriate clothing must be worn for the work being performed. Loose fitting sleeves, shirt tails, and cuffs must be confined to prevent entanglement in moving machinery. For body protection selection refer to Appendix G, "Body Protection Guide."

3.6.1 Early Warning and Visual Protection

Any work that is performed in areas subject to vehicle traffic or any activity exposing employees to vehicular traffic will require wearing an orange uniform shirt or jacket, or an orange or strong yellow-green vest. During rainy weather, orange, strong yellow-green, or yellow rainwear may be worn.

Under night operations, traffic vests with reflective material must be worn under the following conditions:

- When working primarily in the street
- When work involves changes/alterations to existing traffic patterns.

3.6.2 Personal Flotation Devices

All employees must wear Coast Guard-approved personal flotation devices where there is a hazard of drowning when working inside the canal fence in the presence of flowing water or riding on a boat in a reservoir or river. A fall prevention equipment system may be used in lieu of donning personal flotation devices when working inside the canal fence.

3.7 Hearing Protection

Approved hearing protection devices must be provided to employees who are exposed to noise levels exceeding 90 decibels (dBA). Employees may request hearing protection devices (which are provided by District and are available in Stores) at levels below 90 dBA

even though the noise level for the inauguration of a Hearing Conservation Program is 90 dBA, as determined by OSHA. Hearing protection devices must be provided by the District.

Hearing protection must be utilized when operating the following equipment: pneumatic tools, concrete saws, lawn equipment, chain saws, pavement router, backhoe, and cement grinders. This list is not intended to be exhaustive and is a small representation of the types of equipment that would warrant the use of hearing protection devices.

Maintenance personnel must have hearing protection on their person at all times.

Department heads and superintendent/supervisors are encouraged to contact the Safety Officer for assistance in complying with the Hearing Conservation Program. (Refer to Section 7, "Hearing Conservation Program.")

3.8 Respiratory Protection

Employees engaged in operations that produce harmful dusts, fumes, mists, vapors, gases, or environments which are oxygen-deficient require the use of approved respiratory protection devices.

When respiratory equipment is required, the following guidelines apply:

- The District must provide a National Institute for Occupational Health & Safety or Mine Health & Safety Administration approved respirator designed to protect the employee from the identified respiratory hazard;
- Employees required to use a respirator must receive training in the need, use, sanitary care, and limitations of the respiratory equipment provided.
- Employees must be trained in proper fit test and inspection procedures. (Refer to Section 8, “Respiratory Protection Program.”)
- Employees must undergo medical examination and pulmonary function testing prior to being issued or allowed to wear respiratory protection.

Department heads/superintendents/supervisors are responsible for obtaining the proper respirators for the exposure (Refer to Appendix H, “Respirator Selection Guide”). Department heads/superintendents/supervisors are encouraged to contact the Safety Officer for assistance in complying with the Respiratory Protection Program.

3.9 Electric Hazard Protection

Department heads/superintendents/supervisors are responsible for obtaining the proper electric hazard protective clothing, headwear, gloves and other personal protective equipment for the exposure (Refer to Appendix J, K and L). Electric hazard protective clothing must be worn in accordance with Appendix J, K, and L.

Rated protective equipment used for live electrical work such as gloves and hot sticks must be tested every 6 months.

4.0 DEFECTIVE, DAMAGED, "MAKE-SHIFT" EQUIPMENT

Defective, damaged, or "make-shift" personal protective equipment shall not be used under any circumstances.

If PPE is damaged or found to be defective, immediately report its condition to your supervisor so it may be repaired or replaced.

5.0 TRAINING

Supervisors, with assistance from the Safety Officer, will ensure that any employee required to wear PPE to protect against workplace hazards has been trained to know the following:

- when PPE is necessary
- what PPE is necessary
- how to properly don, doff, adjust, and wear PPE
- the limitations of the PPE
- the proper care, maintenance, useful life, and disposal of the PPE

Additionally, each employee must demonstrate an understanding of the training and the ability to use the PPE, before being allowed to perform work requiring the use of PPE.

When a supervisor and/or the safety officer has reason to believe that any employee who has already been trained does not have the understanding and skill required to appropriately use PPE, the employee will be retrained. Other circumstances that require retraining include, but are not limited to, the following:

- changes in the workplace that render previous training obsolete
- changes in the types of PPE to be used that render the previous training obsolete
- inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

All training must be documented by a "Safety Meeting/Training Attendance Form" (See Section 1 "IIPP" Appendix F) and indicate the name of the employee trained, training date(s), and the type of PPE.

6.0 EMPLOYEE OWNED EQUIPMENT

Where employees choose to provide their own personal protective equipment/clothing, the PPE must be inspected to assure its adequacy, including proper maintenance and sanitation, and be authorized by the District Safety Officer.

Employees may not provide any PPE that is considered a part of the District uniform or that contains the logo of another utility or company. These items include:

- Uniform shirts/jackets
- Hard hats



PERScription SAFETY GLASS PROGRAM
Eligible Job Classifications

Canal Operations and Utility Worker	Equipment Operator
Construction Inspector	Grounds Maintenance Assistant
Consumer Field Representative	Instrument Technician
Corrosion Control Technician	Laboratory Technician
Crew Leader - Field	Maintenance Mechanic
Assistant Storekeeper	Meter Reader
Backhoe Operator	Meter Technician
Boom Truck Operator	Reclamation Plant Operator
Complaint Inspector	Senior Equipment Operator
Crew Leader - Field (Canal)	Senior Meter Technician
Crew Leader - Grounds Maintenance	Senior Treatment Plant Operator
Crew Leader - Heavy	Storekeeper
Crew Leader - Maintenance	Treatment Plant Operator
Crew Leader - Maintenance (Canal)	Utility Worker
Crew Leader - Services	Utility Worker (Canal)
Cross Connection Inspector	Water Quality Inspector
Dump Truck Operator	Water Tender
Electrical Technician	

Note: Additional Job Classifications may be designated as eligible by the Safety Officer upon evaluation of job tasks.



SAFETY SHOE PROGRAM

Eligible Job Classifications

Assistant Engineer	Instrument Technician
Assistant Storekeeper	Junior Engineer
Assistant Treatment Plant Operator	Laborer
Associate Engineer	Maintenance Mechanic
Backhoe Operator	Maintenance Superintendent
Boom Truck Operator	Maintenance Worker
Canal Operator & Utility Worker	Maintenance Worker (Canal)
Canal Safety Guard	Meter Reader
Complaint Inspector	Meter Technician
Construction Inspector	Operations and Maintenance Supervisor
Construction Manager	Operations Manager
Consumer Field Representative	Operations Supervisor
Control Operator	Reclamation Plant Operator
Corrosion Control Technician	Relief Operator (Canal)
Crew Leader - Field	Risk Management Officer
Crew Leader - Field (Canal)	Safety Officer
Crew Leader - Grounds Maintenance	Senior Engineer
Crew Leader - Heavy	Sr. Customer Service Representative
Crew Leader - Maintenance	Sr. Equipment Operator
Crew Leader - Maintenance (Canal)	Sr. Meter Technician
Crew Leader - Services	Sr. Treatment Plant Operator
Cross Connection Inspector	Sr. Treatment Plant Operator (Grade 5)
Director of Construction	Storekeeper
Director of Engineering	Treatment Plant Operator
Director of Operations & Maintenance	Treatment Plant Operator (Grade 4)
Distribution Maintenance Manager	Utility Worker
Dump Truck Operator	Utility Worker (Canal)
Electrical Technician	Water Quality Inspector
Engineering Technician I	Water Quality Manager
Engineering Technician II	Water Quality Superintendent
Engineering Technician III	Water Tender
Environmental Compliance Officer	Water Treatment Superintendent
Equipment Operator	Water Treatment Supervisor
Facilities Superintendent	Watershed Management Specialist
Grounds Maintenance Assistant	

Note: Additional Job Classifications may be designated as eligible by the Safety Officer upon evaluation of job tasks.



HAZARD ASSESSMENT CHECK LIST

JOB OR OPERATION TITLE	JOB LOCATION	DEPARTMENT/DIVISION
DATE PERFORMED	PERFORMED BY	VERIFIED BY

Directions: Review the job or operation and indicate whether the job is exposed to any of the hazards. Use footnotes to determine the necessary personal protective equipment.

PROTECTION TYPE	YES	NO	HAZARD EXPOSURE
EYE AND FACE ⁽¹⁾			Flying particles, dust, debris, etc.
			Glare or bright light
			Chemical splashes
			Gases, vapors, or mists
			Protruding objects
			Welding arc, gas welding or torch cutting
FOOT ⁽²⁾			Falling objects
			Rolling objects
			Crushing hazards
			Water/damp locations
			Chemical splashes
HEAD ⁽³⁾			Falling or flying objects
			Ground level moving objects
			Low overhead clearances
			Overhead work
HAND ⁽⁴⁾			Electricity
			Abrasions, cuts, punctures, etc.
			Chemical splashes
			Heat/cold
BODY ⁽⁵⁾			Vibration
			Chemical splashes
			Heat/Cold
			Gases, Mists, and Vapors
HEARING ⁽⁶⁾			Noise > 90 decibels (dBA)
			Impact Noise
			High/Low Pitch Noise
RESPIRATORY ⁽⁷⁾			Dusts, mists, and particles
			Organic vapors
			Acids/Gases
			Lack of Oxygen
			Toxic Chemicals

Note: If any of the hazard exposures were checked as "YES", protection is required. (1) Refer to Appendix E for eye and face protection selection. (2) Must wear steel toed safety shoe. Rubber boots required in wet/damp locations and chemical resistant when working with hazardous chemicals. (3) Must wear hard hat. (4) Refer to Appendix F for hand protection selection. (5) Refer to Appendix G for body protection selection. (6) Must wear ear plugs or muffs. (7) Refer to Appendix H for respiratory protection selection.

EYE AND FACE PROTECTION SELECTION GUIDE		
Source	Assessment of Hazard	Protection
IMPACT - Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding.	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side shields, goggles, face shields. For severe exposures use face shield. See notes (1), (3), (5), (6), & (10).
HEAT - Furnace operations, pouring, casting, hot dipping, welding, and soldering.	Hot sparks	Face shield, goggles, spectacles with side shields. For severe exposures, use face shield. See notes (1), (2), & (3).
	Splash from Molten metals	Face shields worn over goggles. See notes (1), (2), & (3).
	High temperature exposure	Screen, face shields, reflective face shields. See notes (1), (2), & (3).
CHEMICALS - Acids, Caustics, chemical handling, degreasing, etc.	Splash	Splash resistant goggles. For severe exposures, use face shield. See notes (3) & (11).
	Irritating mists	Special purpose goggles w/o vents.
DUST - Woodworking, buffing, excavating, gardening, and general dusty conditions.	Nuisance dust	Spectacles with side shields. For severe exposures use goggles. See note (8).
LIGHT and/or RADIATION Welding: Electric Welding: Gas Cutting, torch brazing, torch soldering Glare	Optical radiation	Welding helmets or welding shields. Typical shades 10-14. See notes (9) & (12).
	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, and brazing 3-4. See note (9).
	Optical radiation	Welding spectacles or welding face shield. Typical shades 1.5-3. See notes (3) & (9).
	Poor vision	Spectacles with shades or special purpose lenses, as suitable. See notes (9) & (10).

Notes to Eye and Face Protection Selection Chart

- (1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against high levels of each of the hazards should be provided. Protective devices do not provide unlimited protection.
 - (2) Operations involving heat may also involve light radiation. Protection from both hazards must be provided.
 - (3) Face shields should only be worn over primary eye protection (Spectacles or goggles).
 - (4) Filter lenses must meet the requirements for the shade designations. Tinted and shades lenses are not filter lenses unless they are marked or identified as such.
 - (5) Persons whose vision requires the use for prescription (Rx) lenses must wear either protective devices fitted with Rx lenses or protective devices designated to be worn over regular Rx eye wear.
 - (6) Wearers of contact lenses must also wear appropriate eye protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
 - (7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
 - (8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.
 - (9) Welding helmets or face shields should be used only over primary eye protection (spectacles or goggles).
 - (10) Non-side shielded spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "Impact."
 - (11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designated and used so that it provides both adequate ventilation and protects the wearer from splash entry.
- Protection from light radiation is directly related to filter lens density. Select the darkest shade that allows task performance. See note (4).

GLOVE SELECTION GUIDE

GENERAL USE GLOVES	
Hazard	Glove Type
Cuts, abrasions, splinters, etc.	Leather Gloves
Welding Arc, Metal Slag, etc.	Leather Welding Gloves/Gauntlets
Hot/Cold Surfaces/Objects	Insulated Leather Gloves
Slippery Surfaces/Objects	Leather/Rubber-Coated Cotton Gloves
Water/Sanitation	Latex/Vinyl Gloves
Vibration	Padded Palm Gloves

CHEMICAL RESISTANT GLOVES							
CHEMICALS	Natural Rubber or Latex	Neoprene Rubber	Latex/Neoprene	Butyl Rubber	Buna-N or NBR Rubber	Nitrile	Polyvinyl Chloride
Acetic acid	G	G	G	G	G	G	G
Acids (dilute)	G	G	G	G	G	G	G
Acids (concentrated)	NR	G	G	G	NR	NR	NR
Alkalis	G	G	G	G	G	G	G
Alcohols	G	G	G	G	G	G	G
Aromatic hydrocarbons (toluene, xylene, etc)	NR	F	F	F	NR	G	NR
Ketone	G	G	G	G	NR	NR	NR
Lacquer thinner	NR	NR	F	NR	G	NR	NR
Paint & varnish remover	NR	F	F	F	F	G	NR
Paint thinner	NR	G	G	NR	G	G	NR
Petroleum distillates	NR	G	G	NR	G	G	NR
Polyester resin	NR	NR	F	NR	F	G	NR
Turpentine	NR	G	G	NR	G	G	NR
G - Good; F - Fair; NR - Not Recommended							

LOW AND HIGH VOLTAGE GLOVES	
Class of Glove	Maximum use voltage A-C RMS
00	500
0	1,000
1	7,500
2	17,000
3	26,500
4	36,000

Note: Leather protective gloves must be worn over electrical gloves when working with voltages above 250 Volts.



BODY PROTECTION SELECTION GUIDE	
Hazard/Source	Protection
Nuisance contamination of dirt, grease, oil, hydraulic fluid, etc.	Work uniform or coveralls
Nuisance contamination of dirt, grease, oil, hydraulic fluid, etc.	“Tyvek” coverall
Small quantities of hazardous chemicals, acids/bases, and solvents	Apron, lab coat, or chemical resistant “Tyvek” coverall
Large quantities of hazardous chemicals, acids/bases, or solvents	Acid/chemical resistant suit
Rain or water spray	Rain suit
Temperatures below 50° F	Cold weather jacket
Vehicle Traffic	Orange or strong yellow-green reflective vest/jacket
Drowning (inside canal fence or on a boat in a reservoir)	Coast Guard approved personal floatation device
Electric arc flash	Flame resistant shirt or flash suit (see Appendix J, K, and L)

RESPIRATOR SELECTION GUIDE	
Hazard	Respirator Type
Nuisance Dust/Mists up to one (1) times the personnel exposure limit (PEL) ⁽¹⁾	Disposable Dust/Mist Respirator
Dust, Mists, Vapors, and Gases (5 X PEL) ⁽¹⁾	½ Mask Respirator ⁽²⁾
Dust, Mists, Vapors, and Gases (10 X PEL) ⁽¹⁾	Full Face Respirator ⁽²⁾
Dusts, Mists, Vapors, and Gases (50 X PEL) ⁽¹⁾	Powered-Air Purifying Respirator (PAPR) ⁽²⁾
Dusts, Mists, Vapors, Gases (100 X PEL) ⁽¹⁾ and Oxygen deficient environments	Self-Contained Breathing Apparatus (SCBA) ⁽³⁾
Dusts, Mists, Vapors, Gases (100 X PEL) ⁽¹⁾ and Oxygen deficient environments	Supplied-Air Respirator ⁽³⁾
Emergency (100 X PEL) ⁽¹⁾	Self-Contained Escape Pack (SKAPAC) ⁽³⁾

Note: (1) Consult Safety Officer for OSHA Permissible Exposure Limits. (2) Cartridge for specific contaminant must be selected from guide below. (3) Compressed air used for respiration shall meet at least the requirements for Grade D breathing air (ANSI Z86.1-1978). Oxygen 19.5 to 23.5%, Hydrocarbons less than 5 mg/M³ at NTP, Carbon Monoxide less than 20 ppm, no pronounced color, Carbon Dioxide less than 1000 ppm.

RESPIRATOR CARTRIDGE/CANISTER SELECTION GUIDE	
Atmospheric Contaminant to be protected against	Cartridge/Canister Color
Acid gases	White
Hydrocyanic acid gas	White with ½ inch green stripe completely around the canister near the bottom.
Chlorine gas	White with ½ inch yellow stripe completely around the canister near the bottom.
Organic vapors	Black
Ammonia gas	Green
Acid gases and ammonia gas	green with ½ inch white stripe completely around the canister near the bottom.
Hydrocyanic acid gas and chloropicrin vapor	Yellow with ½ inch blue stripe completely around the canister near the bottom
Acid gases, organic vapors, and ammonia gases	Brown
Particulate (dusts, fumes, mists, fogs, or smoke).	Purple (Magenta)
Particulate in combination with any of the above gases or vapors	Canister color for contaminant, with ½ inch gray stripe completely around canister near the top.
Radioactive materials, except tritium and noble gases.	Purple (Magenta)
All of the above atmospheric contaminants	Red with ½ inch gray stripe completely around the canister near the top.

PERSONAL PROTECTION LEVEL GUIDE	
Level	Equipment/Clothing
<p>Level A - To be selected when the greatest level of skin, respiratory, and eye protection is required.</p>	<ol style="list-style-type: none"> 1. Positive pressure, full face-piece, self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH) 2. Totally-encapsulating chemical-protective suit 3. Work uniform or coveralls 4. Long underwear* 5. Gloves, outer, chemical-resistant 6. Gloves, inner, chemical-resistant 7. Boots, chemical-resistant, steel toe and shank 8. Hard hat (under suit)* 9. Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit.)
<p>Level B - The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.</p>	<ol style="list-style-type: none"> 1. Positive-pressure, full-facepiece, self-contained breathing apparatus (SCBA), or positive-pressure supplied-air respirator with escape SCBA (NIOSH approved) 2. Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls) 3. Work Uniform or coveralls 4. Gloves, outer, chemical-resistant 5. Gloves, inner, chemical-resistant 6. Boots, outer, chemical-resistant steel toe and shank 7. Boot-covers, outer, chemical-resistant (disposable)* 8. Hard hat* 9. Face shield*
<p>Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.</p>	<ol style="list-style-type: none"> 1. Full-face or half-mask, air-purifying respirators (NIOSH approved) 1. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).

	<ul style="list-style-type: none"> Work uniform or coveralls 2. Gloves, outer, chemical-resistant 3. Gloves, inner, chemical-resistant 4. Boots (outer), chemical-resistant steel toe and shank* 5. Boot-covers, outer, chemical-resistant (disposable)* 6. Hard hat* 7. Escape respirator* 8. Face shield*
<p>Level D - A work uniform affording minimal protection; used for nuisance contamination only.</p>	<ul style="list-style-type: none"> 1. Work uniform or coveralls 2. Gloves* 3. Boots/shoes, chemical-resistant steel toe and shank 4. Boots, outer, chemical-resistant (disposable)* 5. Safety glasses with side shields 6. chemical splash goggles* 7. Hard hat* 8. Face shield*

Note: * Optional or applicable based on hazards present.

Appendix J
Working On Or Near Live Parts
Hazard/Risk Category Classifications

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/Risk Category	V-rated Gloves	V-rated Tools
Panelboards Rated 240 V and Below – Notes 1 and 3			
Circuit breaker (CB) or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	0	N	N
Work on energized parts, including voltage testing	1	Y	Y
Remove/install CBs or fused switches	1	Y	Y
Removal of bolted covers (to expose bare, energized parts)	1	N	N
Opening hinged covers (to expose bare, energized parts)	0	N	N
Panelboards or Switchboards Rated >240 V and up to 600 V (with molded case or insulated case circuit breakers) – Notes 1 and 3			
CB or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
600 V Class Motor Control Centers (MCCs) – Notes 2 (except as indicated) and 3			
CB or fused switch or starter operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch or starter operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal of individual starter “buckets” from MCC – Note 4	3	Y	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N
600 V Class Switchgear (with power circuit breakers or fused switches) – Notes 5 and 6			
CB or fused switch operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	3	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	3	N	N
Opening hinged covers (to expose bare, energized parts)	2	N	N

Appendix J – Working On Or Near Live Parts

Hazard/Risk Category Classifications (*Continued*)

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/Risk Category	V-rated Gloves	V-rated Tools
Other 600 V Class (277 V through 600 V, nominal)			
Equipment – Note 3			
Lighting or small power transformers (600 V, maximum)	—	—	—
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
Revenue meters (kW-hour, at primary voltage and current)	—	—	—
Insertion or removal	2*	Y	N
Cable trough or tray cover removal or installation	1	N	N
Miscellaneous equipment cover removal or installation	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
NEMA E2 (fused contactor) Motor Starters, 2.3 kV Through 7.2 kV			
Contactor operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
Contactor operation with enclosure doors open	2*	N	N
Work on energized parts, including voltage testing	3	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	3	Y	Y
Insertion or removal (racking) of starters from cubicles, doors open	3	N	N
Insertion or removal (racking) of starters from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	3	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Metal Clad Switchgear, 1 kV and Above			
CB or fused switch operation with enclosure doors closed	2	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	4	N	N
Work on energized parts, including voltage testing	4	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	2	Y	Y
Work on control circuits with energized parts >120 V, exposed	4	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	4	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	4	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Opening voltage transformer or control power transformer compartments	4	N	N

Appendix J – Working On Or Near Live Parts

Hazard/Risk Category Classifications (*Continued*)

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/Risk Category	V-rated Gloves	V-rated Tools
Other Equipment 1 kV and Above			
Metal clad load interrupter switches, fused or unfused	—	—	—
Switch operation, doors closed	2	N	N
Work on energized parts, including voltage testing	4	Y	Y
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Outdoor disconnect switch operation (hookstick operated)	3	Y	Y
Outdoor disconnect switch operation (gang-operated, from grade)	2	N	N
Insulated cable examination, in manhole or other confined space	4	Y	N
Insulated cable examination, in open area	2	Y	N

Note:

V-rated Gloves are gloves rated and tested for the maximum line-to-line voltage upon which work will be done.

V-rated Tools are tools rated and tested for the maximum line-to-line voltage upon which work will be done.

2* means that a double-layer switching hood and hearing protection are required for this task in addition to the other Hazard/Risk Category 2 requirements of Table 130.7(C)(10).

Y = yes (required)

N = no (not required)

Notes:

1. 25 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
2. 65 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
3. For < 10 kA short circuit current available, the hazard/risk category required may be reduced by one number.
4. 65 kA short circuit current available, 0.33 second (20 cycle) fault clearing time.
5. 65 kA short circuit current available, up to 1.0 second (60 cycle) fault clearing time.
6. For < 25 kA short circuit current available, the hazard/risk category required may be reduced by one number.

Appendix K – Working On Or Near Live Parts

Protective Clothing and Personal Protective Equipment (PPE) Matrix

Protective Clothing and Equipment	Protective Systems for Hazard/Risk Category					
Hazard/Risk Category Number	-1 (Note 3)	0	1	2	3	4
Non-melting (according to ASTM F 1506-00) or Untreated Natural Fiber						
a. T-shirt (short-sleeve)	X			X	X	X
b. Shirt (long-sleeve)		X				
c. Pants (long)	X	X	X (Note 4)	X (Note 6)	X	X
FR Clothing (Note 1)						
a. Long-sleeve shirt			X	X	X (Note 9)	X
b. Pants			X (Note 4)	X (Note 6)	X (Note 9)	X
c. Coverall			(Note 5)	(Note 7)	X (Note 9)	(Note 5)
d. Jacket, parka, or rainwear			AN	AN	AN	AN
FR Protective Equipment						
a. Flash suit jacket (multilayer)						X
b. Flash suit pants (multilayer)						X
c. Head protection						
1. Hard hat			X	X	X	X
2. FR hard hat liner					AR	AR
d. Eye protection		—	—	—	—	—
1. Safety glasses	X	X	X	AL	AL	AL
2. Safety goggles				AL	AL	AL
e. Face and head area protection		—	—	—	—	—
1. Arc-rated face shield, or flash suit hood				X (Note 8)		
2. Flash suit hood					X	X
3. Hearing protection (ear canal inserts)				X (Note 8)	X	X
f. Hand protection			—	—	—	—
Leather gloves (Note 2)			AN	X	X	X
g. Foot protection						
Leather work shoes			AN	X	X	X

AN = As needed

AL = Select one in group

AR = As required

X = Minimum required

Notes:

1. See table 130.7(C)(11). Arc rating for a garment is expressed in cal/cm².
2. If voltage-rated gloves are required, the leather protectors worn external to the rubber gloves satisfy this requirement.
3. Hazard/Risk Category Number “-1” is only defined if determined by Notes 3 or 6 of Table 130.7(C)(9)(a).
4. Regular weight (minimum 12 oz/yd² fabric weight), untreated, denim cotton blue jeans are acceptable in lieu of FR pants. The FR pants used for Hazard/Risk Category 1 shall have a minimum arc rating of 4.
5. Alternate is to use FR coveralls (minimum arc rating of 4) instead of FR shirt and FR pants.
6. If the FR pants have a minimum arc rating of 8, long pants of non-melting or untreated natural fiber are not required beneath the FR pants.
7. Alternate is to use FR coveralls (minimum arc rating of 4) over non-melting or untreated natural fiber pants and T-shirt.
8. A faceshield with a minimum arc rating of 8, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or, alternatively, a flash suit hood), is required.
9. Alternate is to use two sets of FR coveralls (the inner with a minimum arc rating of 4 and outer coverall with a minimum arc rating of 5) over non-melting or untreated natural fiber clothing, instead of FR coveralls over FR shirt and FR pants over non-melting or untreated natural fiber clothing.

Appendix L – Working On Or Near Live Parts

Protective Clothing Characteristics

Typical Protective Clothing Systems		
Hazard/Risk Category	Clothing Description (Typical number of clothing layers is given in parentheses)	Required Minimum Arc Rating of PPE [J/cm ² (cal/cm ²)]
0	Non-melting, flammable materials (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight at least 4.5 oz/yd ² (1)	N/A
1	FR shirt and FR pants or FR coverall (1)	16.74 (4)
2	Cotton underwear – conventional short sleeve and brief/shorts, plus FR shirt and FR pants (1 or 2)	33.47 (8)
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls (2 or 3)	104.6 (25)
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit (3 or more)	167.36 (40)

Note: Arc rating is defined in Article 100 and can be either ATPV or E_{BT}. ATPV is defined in ASTM F 1959-99 as the incident energy on a fabric or material that results in sufficient heat transfer through the fabric or material to cause the onset of a second-degree burn based on the Stoll curve. E_{BT} is defined in ASTM F 1959-99 as the average of the five highest incident energy exposure values below the Stoll curve where the specimens do not exhibit breakopen. E_{BT} is reported when ATPV cannot be measured due to FR fabric breakopen.