

# INFORMATION ONLY

<b>ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE</b>	<b>Manual No</b>	<b>21100 WP OU 015</b>
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	<b>Organization</b>	<b>Environmental Management</b>

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**APPENDIX B**  
**Standard Personal Protective Equipment**  
**8 pages**

## **APPENDIX B STANDARD PPE**

Some pieces of protective equipment such as hard hats boots and respirators have specific standards for manufacture and only those items meeting these standards should be used. However there are no such standards for much of the chemical protective clothing used in field activities. The following requirements provide guidance pertaining to the more common types of standard PPE.

### **EYE PROTECTION**

If work is being performed that potentially can harm the eyes such as tasks that cause splashing release of projectiles or release of sufficient vapors or dusts as to cause an eye irritation problem eye protection shall be worn.

When ambient conditions require the use of a full face respirator the respirator provides the primary protection for the eyes with secondary protection provided by a face shield or a splash hood. However if respiratory protection is not required then a combination of safety glasses safety goggles face shield splash hoods and sweat bands are used to provide eye protection.

### **USE OF NON-SAFETY EYEGASSES AND CONTACT LENSES**

Non safety eyeglasses shall not be worn alone for onsite activities or activities adjacent to the site if there is the potential for damage to the eyeglasses due to site related work activities or if the activities cause splashing or release of projectiles. Safety glasses meeting the ANSI Safety Glasses Standard Z87.1-1968 are required. The exception to this rule are eyeglass inserts designed to be worn under a full face respirator. Note however that in some instances non safety eyeglasses can be used for site activities if they are used in conjunction with the appropriate goggles or face shields.

In general eyeglasses do not protect against dusts vapors or mists goggles or a full face respirator must be worn. Contact lenses shall not be worn for onsite activities or activities adjacent to the site if the activities cause splashing release of projectiles generation of

dusts in excess of the OSHA nuisance dust standards or any activity which could not be safely performed using contact lenses. Contact lenses are not to be worn in conjunction with respiratory protection or in areas with potential for contact with eye irritants.

Contact lenses may be worn for administrative activities adjacent to the site providing that the activities preclude contact with site contaminants.

Individuals whose vision is not correctable with prescription eyeglasses are handled on a case by case basis. These individuals should contact the Health and Safety Manager.

### **EYEGLOSS INSERTS FOR RESPIRATORS**

Eyeglass inserts designed for use with the specific respirator worn shall be used by all personnel whose vision is not adequate to safely perform site work activities without the use of corrective lenses.

### **SAFETY GLASSES**

Safety glasses shall meet the current ANSI Z87.1. Safety glasses are used to protect the eyes against large particles and projectiles but must be used in conjunction with face shields or goggles in order to protect against splashes. They generally do not provide protection against dusts, vapors, or mists. If lasers are used to survey a site, special protective safety glasses are required. Common prescription glasses are sometimes called safety glasses but they are not the industrial quality glasses required by ANSI Z87.1.

### **FACE SHIELDS, SPLASH HOODS, GOGGLES, AND SWEAT BANDS**

Face shields and splash hoods protect against chemical splashes but generally do not provide adequate protection against projectiles or dusts. They are used in conjunction with a respirator when projectile/dust protection is required or with safety glasses when protection against projectiles is required in addition to splash protection. Face shields and splash hoods must be suitably supported (for example, attached to a hard hat) to prevent them from shifting and exposing portions of the face or obscuring vision.

Goggles can be used to protect against splashes and projectiles if they are constructed with impact resistant lenses and offer some protection against dusts under some circumstances. However, in many instances, adequate splash protection is provided by using a face shield in conjunction with goggles. Goggles may be worn over non safety eyeglasses to provide protection against projectiles and some dusts.

### **HEARING PROTECTION**

Ear plugs or muffs will be worn by personnel who are required to perform tasks around heavy machinery and impact tools where physiological damage to the ears is likely. The

OSHA noise standards apply and must be considered especially in the case of long term site activities Ear protection must comply with OSHA 29 CFR 1910 95 Use of ear protection must be carefully considered because of the increased potential of chemical contaminants being introduced into the ear as a result of their use

## **FOOT PROTECTION**

Foot protection including leather work boots and rubber boots worn during site activities must meet the specifications of ANSI Z41 1983 and OSHA 29 CFR 1910 136 The material used to make the boots is not subject to any standards For RTG field activities the boots must be steel or fiberglass toe/shank

Protection against liquid hazardous chemicals requires a boot constructed of an elastomer neoprene PVC butyl rubber or some other chemically resistant material

Boots are available in two systems overboots (boot covers) and chemical resistant boots Overboots may be inexpensive enough to be considered disposable and are generally worn over a leather steel toe/shank boot The overboot system has the advantage of allowing the wearer to be fitted to a leather underboot which then doubles as general site footwear However if the overboot nps and contaminants are absorbed into the leather boot the leather boot may need to be disposed

Chemically resistant boots are available in a variety of elastomers Using chemically resistant boots has the advantage of being easier and more convenient than the overboot system since only one boot is required The disadvantage is that they need to be decontaminated

Note that when coveralls or splash suits are worn with boots the garment is taped over the boot so that splashed material does not run into the boot

## **HAND PROTECTION**

Gloves are used to provide hand protection There are presently no standards governing glove construction and materials

Gloves must resist puncturing and tearing as well as provide the necessary chemical resistance In many instances particularly when protecting against concentrated source materials gloves may have to be layered In this case gloves are referred to as inner

gloves and outer gloves Heavy leather gloves may be worn over chemical protective gloves when doing heavy work If they become contaminated they should be discarded because leather is difficult to decontaminate

Jacket cuffs should be taped over glove cuffs to prevent any liquid from flowing into the gloves If hands are elevated above the head during work the taping rule should be altered and the gloves should be taped over the jacket cuffs to prevent any liquid from spilling down the sleeves In either case gloves should be sealed to the coveralls or splashsuit with tape

When selecting gloves consider thickness and cuff length The thicker and longer the glove the greater the protection However the glove should not be so thick that it interferes with necessary dexterity

### **TAPING OF JOINTS**

Boots and gloves are generally taped to the protective garment in order to reduce the possibility of contaminants flowing into them but the taped joint is not a chemical barrier Duct tape is most commonly used

The rule of taping is that the protective garment is taped over the glove or boot so that contaminants do not flow in However if a significant amount of overhead work will be done consider taping the glove over the garment sleeve

### **HEAD PROTECTION**

The hardhat a basic piece of safety equipment used in many work operations must meet ANSI Z89 1 1969 and OSHA 29 CFR 1910 135 specifications Manufacturers have adapted hard hats so that ear protection and faceshields may be easily attached

Hard hats are adjustable so that a helmet liner can be worn during cold-weather A chin strap is advantageous when work involves bending and ducking and also helps secure the hardhat to the head when full face masks are worn

Faceshields that attach to hard hats provide added protection A combination that leaves no gap between the shield and the brim of the cap is best because it prevents overhead splashes from running down inside the faceshield The faceshield must meet ANSI Z89 1 1968 specifications

## **PPE INSPECTION, MAINTENANCE AND STORAGE**

### **INSPECTION**

The RTG PPE inspection program applies mainly to protective garments. Inspection of respiratory protection devices is described in Appendix C.

Inspections include

Inspection of garments as they are issued and/or prior to field use

Inspection after use or training and prior to maintenance

Periodic inspection of stored equipment and

Periodic inspection when a question arises concerning the appropriateness of the selected equipment or when problems with similar equipment arise

Most RTG field operations utilize disposable protective garments such as Tyvek and coated Tyvek coveralls and nitrile gloves. For some operations garments which are more expensive or rugged are used and present the potential for reuse (e.g. Viton gloves and PVC raingear). Inspection of these garments is of particular importance as chemicals that have begun to permeate clothing during use may not be removed during decontamination and may continue to diffuse through the material toward the inside surface presenting a direct skin contact hazard to the next person who uses the clothing.

Where such potential hazards may develop clothing should be checked inside and out for discoloration or other evidence of contamination. This is particularly important for suits which may be subject to reuse due to their cost. Note however that negative (i.e. no chemical found) test results do not necessarily preclude the possibility that some absorbed chemical will reach the suit's interior.

At present little documentation exists regarding clothing reuse. Reuse decisions must consider the known factors of permeation rates as well as the toxicity of the contaminant(s). Unless extreme care is taken to ensure that clothing is properly decontaminated and that the decontamination does not degrade the material the reuse of chemically protective clothing that has been contaminated with toxic chemicals is not advisable.

The following sections present a general PPE inspection checklist for various types of inspections. Each inspection will cover somewhat different areas in varying degrees of depth. For disposable garments the inspection steps outlined below will be used before and during use. Reusable garments will be subjected to the before use inspection after

they are fully decontaminated. Any garment that is found to be defective in pre- or post-use inspection will be discarded.

Any worker who experiences a garment failure as listed in the during the work task check list will immediately exit the work area go through the decontamination process, and replace the garment Duct tape patch ups are not acceptable as duct tape is regarded as having no resistance to chemical permeation or degradation

Records must be kept of all inspections of reusable garments At a minimum each inspection should record the item, date inspector and any unusual conditions or findings Periodic review of these records may indicate an item or type of item with excessive maintenance costs or a particularly high level of downtime

### **Before Use Monitoring**

Determine that the clothing material is correct for the specific task at hand

Visually inspect for  
imperfect seams  
non uniform coatings  
tears malfunctioning closures

Hold up to light and check for pinholes

Flex product  
observe for cracks  
observe for other signs of shelf deterioration

If the product has been used previously inspect inside and out for signs of chemical attack  
discoloration  
swelling  
stiffness and

Pressunze gloves to check for pinholes Either blow into the glove then roll gauntlet towards fingers or inflate glove and hold under water In either case no air should escape

### **In Use Monitoring**

Evidence of chemical attack such as discoloration swelling stiffening and softening Keep in mind however that chemical permeation can occur without any visible effects

Closure failure

Tears

Punctures

**Seam discontinuities**

**Degradation of the protective ensemble**

**Perception of odors**

**Skin irritation**

**Unusual residues on PPE**

**Discomfort**

**Resistance to breathing**

**Fatigue due to respirator use**

**Interference with vision or communication**

**Restriction of movement or**

**Personal responses such as rapid pulse nausea and chest pain**

## **STORAGE**

**Clothing and respirators must be stored properly to prevent damage or malfunction due to exposure to dust moisture sunlight damaging chemicals extreme temperatures and impact Many equipment failures can be directly attributed to improper storage**

**Potentially contaminated clothing should be stored in an area separate from street clothing**

**Potentially contaminated clothing should be stored in a well ventilated area with good air flow around each item if possible**

**Different types sizes and materials of clothing and gloves should be stored separately to prevent issuing the wrong material by mistake**

**Protective clothing should be folded or hung in accordance with manufacturers recommendations**

**Garments should be stored in the original carton until use**

**Small quantities of garments to be used at the site should be stored in plastic bags**

Reusable items such as hard hats goggles and boots must be fully decontaminated prior to being returned to storage (or the office)

PPE will not be stored in areas where it can come into contact with chemicals

## **MAINTENANCE**

Maintenance of respiratory protection devices is described in Appendix C Maintenance requirements for other PPE items used at typical RTG operations is limited for most items are either disposable will be discarded upon failure or will be returned to the manufacturer for maintenance The Health and Safety Manager should be contacted for maintenance guidance for any items of personal protective equipment