PROTECTIVE EQUIPMENT ON CONSTRUCTION JOBSITES

WHITEPAPER

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PROTECTIVE EQUIPMENT ON CONSTRUCTION JOBSITES

THE IMPORTANCE OF PPE

Personal protective equipment (PPE) is worn to minimize workers' exposure to serious jobsite hazards that can cause injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other jobsite hazards. PPE can include hard hats, safety glasses, gloves, protective footwear, earplugs or muffs, respirators, or protective clothing like high-visibility vests, fire-resistant and arc-rated apparel, and weather-related PPE.

The main concerns with providing PPE include:

- PPE Certification
- Assessing the hazards
- Identifying methods to control the hazards
- Paying for required PPE
- Selecting the right PPE for the job
- Making sure the equipment fits comfortably
- Conducting training

Certification ensures PPE meets rigorous testing and design requirements and will protect workers as intended.

CERTIFIED PPE

It's essential to purchase certified PPE that has been tested to meet regulatory and consensus safety standards. Certified PPE has been tested to ensure that it protects workers as it is designed. Certified PPE is identified with an appropriate marking, logo, or safety standard.

An approved laboratory performs tests and certifies that the PPE meets the agency's or organization's certification criteria. Here are some examples of how PPE is certified in the United States:

- **RESPIRATORY DEVICES** must be NIOSH-certified and need to comply with 42 CFR Part 84, which establishes criteria to ensure that respiratory devices are adequately designed to protect workers from atmospheric hazards.
- **HIGH-VISIBILITY APPAREL** must meet ANSI/ISEA 107 design requirements. In particular, it must have a minimum amount of surface area that's reflective depending on what performance class it is.
- **GLOVES** are tested and rated to protect against or resist a specific hazard per ANSI/ISEA 105. They can be rated for a particular puncture, cut, or abrasion resistance. Other performance characteristics include chemical protection, ignition resistance, or vibration reductions.
- **EYE AND FACE PROTECTION** must conform to requirements in ANSI Z87.1. Safety glasses, goggles, and face shields are rated for specific hazards such as impact protection, chemical splash and dust protection, and optical radiation.
- **HARD HATS AND BUMP CAPS** must protect workers from impact hazards per ANSI/ISEA Z89.1. Tests are performed to rate flammability, force transmission, apex penetration, wetness, and temperature.
- **FOOTWEAR** must conform to ANSI Z41 or ASTM F-2412. These standards establish criteria to measure impact resistance, compression resistance, metatarsal impact resistance, electrical conductivity, and dielectric protection.
- **HEARING PROTECTION** must be assigned a noise reduction rating that the Environmental Protection Agency establishes. ASNI/ASA S12.6 specifies criteria that testing laboratories use to determine the noise-reducing capacity of hearing protection devices.
- **ARC-RATED (AR) APPAREL** conforms to third-party consensus standards such as NFPA 70E, *Standard for Electrical Safety Requirements for Employee Workplaces*. It is a voluntary consensus standard employers commonly reference for protection from arc flash hazards.

- **FIRE-RESISTANT (FR) CLOTHING** also conforms to third-party consensus standards such as NFPA 2112, *National Fire Protection Association Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire. ASTM F1506, Standard Performance Specification For Flame Resistant And Electric Arc Rated Protective Clothing Worn By Workers Exposed To Flames And Electric Arcs*, provides both FR and AR protection.

Refer to the PPE regulatory or consensus standards to verify which version is most current. If your workers are outside the United States, some countries have adopted the safety standards above for PPE certification; check to see if the country you're working in has additional requirements.

EMPLOYERS MUST PERFORM A PPE ASSESSMENT

The employer must survey the jobsite to determine if any hazards are present that would necessitate PPE use. Employers must use this survey to:

- Select and require that workers wear PPE when they are exposed to hazards.
- Communicate to workers about what PPE is required.
- Train workers how to properly don and doff PPE.
- Ensure employees' PPE is comfortable and fits appropriately.

CONSIDER THE POSSIBILITY OF EXPOSURE TO SEVERAL HAZARDS SIMULTANEOUSLY.

As you note hazards, consider the layout of the jobsite and the location of other workers and contractors. Also, review injury/illness data to help identify problem areas. Organize your data and information after the walk-through survey to prepare for an analysis of the hazards. The analysis will enable you to select proper protective equipment.

Estimate the potential for injuries using the data collected from your hazard assessment. Determine the type, level of risk, and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

Reassess the jobsite hazard situation as necessary. Identify and evaluate new equipment and processes, review accident records, and reevaluate the suitability of previously selected PPE.

GENERALLY, KEEP PPE ON HAND AS A LAST LINE OF DEFENSE

CONTROLLING A HAZARD AT ITS SOURCE IS THE BEST WAY TO PROTECT EMPLOYEES.

PPE is the last line of defense against hazards when other safe work practices and control methods are not effective. Controlling a hazard at its source is the best way to protect employees. Employers should keep different PPE types on hand depending on what hazards are present in their jobsite.

Depending on the hazard or jobsite conditions, OSHA prefers the use of engineering, administrative, and work practice controls to manage or eliminate hazards to the greatest extent possible. For example, building a barrier between the hazard and the employees is an engineering control; changing how employees are available to perform a task is an administrative control; changing the way employees perform a task is a work practice control.

When engineering, administrative, and work practice controls are not feasible or do not provide sufficient protection, employers must provide PPE to their employees and ensure its use.

EMPLOYERS MUST PAY FOR PPE

The payment provisions in OSHA's general construction rule on PPE at §1926.95(d) start with the requirement that employers must pay for the PPE that employees use to comply with OSHA standards. This applies to protective clothing along with:

- Eye and face protection,
- Equipment operating procedures,
- Lockout/tagout procedures, and
- Confined space entry permits.

If a particular item is not PPE or not required by OSHA standards, it is not covered by the rule. Examples of PPE for which the employer must pay include:

- Hard hats,
- High-visibility apparel and vests,
- Rubber boots with steel toes,
- Fire-resistant clothing,
- Arc-rated clothing,
- Firefighting PPE,
- Chemical-resistant gloves,
- Fall protection systems, and
- Life jackets.

OSHA'S GENERAL PPE RULE INCLUDES SOME PAYMENT EXCEPTIONS.

EXCEPTIONS

OSHA's general PPE rule includes some payment exceptions based on the type of PPE.

The first exception addresses non-specialty prescription safety eyewear and non-specialty safety-toe protective footwear. The second exception relates to metatarsal protection. A third exception is for logging boots. And the fourth exception relates to everyday clothing.

EVERYDAY CLOTHING

OSHA exempts everyday work clothing and clothing or other items used solely for protection from the weather. You do not have to pay for everyday clothing even though you may require your employees to wear such items as long pants or long-sleeve shirts. This clothing may have some protective value, but OSHA does not consider it to be PPE.

Also, employees who work outdoors will normally have clothing to protect themselves from the elements. For example, if you are a landscaper, you do not have to pay for workers' raincoats, jackets, hats, and other weather-related gear. However, OSHA notes that there may be the rare case that ordinary weather gear is not sufficient to protect the employee, and special equipment or extraordinary clothing is needed for unusually severe weather conditions. In this situation, you are required to pay for the protection.

Items worn to keep employees clean for purposes unrelated to safety or health are not considered PPE. Items like coveralls or aprons worn solely to prevent clothing and skin from getting dirty are not PPE, and employer payment is not required. OSHA requires employer payment for work gloves when they are used for protection against jobsite hazards. When gloves are used as PPE — to protect employees from such hazards as lacerations, abrasions, and chemicals — you must provide them at no cost.

YOU MAY ALLOW EMPLOYEES TO PROVIDE THEIR PPE VOLUNTARILY.

EMPLOYEE-OWNED EQUIPMENT

You may have a situation where PPE is required, and you do provide it at no cost, but the employee voluntarily wants to use his PPE. You can allow a worker to use his protective equipment if you determine it will provide adequate protection. You are not required to reimburse the employee for it.

OSHA clarifies that you must not require employees to provide or pay for their own necessary PPE. This prevents employers from avoiding their obligations by requiring workers to purchase PPE as a condition of employment.

YOU DO NOT HAVE TO PAY TO REPLACE LOST OR INTENTIONALLY DAMAGED PPE.

PAYMENT OPTIONS

You are free to use any payment method as long as it results in PPE being provided at no cost. You can use one payment method for all types of PPE or different payment methods for different equipment types.

The method that appears to be the most effective is for employers to purchase the PPE themselves, keep a ready supply on hand, and distribute it directly to their workers. An allowance system gives workers a certain amount of money to use to purchase specific equipment.

In a voucher system, you typically have an arrangement with a local PPE retailer or distributor. You give vouchers to your workers to use when they shop. The retailer or distributor will accept the voucher instead of direct payment and then bill you for the purchase. In a reimbursement program, you require workers to purchase the equipment, and then you reimburse them.

REPLACEMENT PPE

The rule requires you to pay for the equipment when you first issue it and when you replace it.

Damaged or worn-out PPE does not provide adequate protection. According to OSHA, PPE is more likely to be replaced promptly when the employer pays for it.

To help keep the equipment from getting lost, it is okay with OSHA if you require workers to keep the equipment in a secured locker or turn it in at the end of the shift. You are also free to allow employees to take the PPE off-site to use at home or other jobs. But be sure employees understand that they are responsible for any loss of the equipment.

The rule does not prohibit you from charging workers for replacement PPE when they fail to bring it back to the jobsite. You do not have to pay for replacement PPE when the worker has lost or intentionally damaged it.

RESPIRATORY PROTECTION

Per §1926.103, requirements for construction work requiring respiratory protection are identical to §1910.134. With no exceptions, when respiratory protection is required, "the employer shall provide respirators, training, and medical evaluations at no cost to the employee." This requirement is found in §1910.134(c)(4).

HEARING PROTECTORS

Workers exposed to an 8-hour time-weighted average of greater than 90 decibels must be provided hearing protectors at no cost to the employees. Hearing protectors must be replaced as necessary.

PPE SELECTION

SELECT PPE THAT OFFERS THE RIGHT LEVEL OF PROTECTION.

As you select PPE, consider how much protection it provides, and make sure you select equipment that offers the right level of protection. After completing the hazard assessment, the general procedure for the selection of protective equipment is to:

- Become familiar with the potential hazards, the type of protective equipment that is available, and what it can do (i.e., splash protection, impact protection, etc.).
- Compare the hazards associated with the environment (i.e., impact velocities, masses, projectile shape, radiation intensities) with the capabilities of the available protective equipment.
- Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards.
- Fit the user with the protective device and give instructions on the care and use of the PPE. End-users must be aware of all warning labels and limitations of their PPE.

OSHA MAY REFERENCE ANSI, ASTM STANDARDS FOR PPE SELECTION.

HEAD PROTECTION

OSHA's standard on head protection (§1926.100) requires the use of the equipment when working in areas where there is a potential for injury to the head from falling objects, and the equipment must be designed to reduce electrical shock hazard when working near exposed electrical conductors that could contact the head.

OSHA's standard references American National Standards Institute (ANSI) Z89.1, *American National Standard for Industrial Head Protection* at §1926.100(b)(1). Head protection must comply with either 2009, 2003, or 1997 editions of the standard.

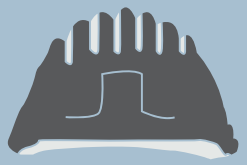
EYE AND FACE PROTECTION

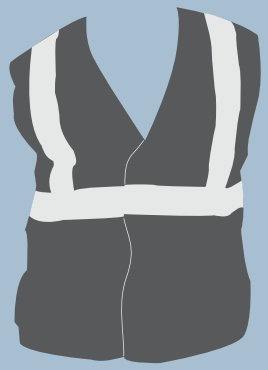
OSHA's standard on eye and face protection (§1926.102) states the protection is needed when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. Side protection is required when there is a hazard from flying objects.

OSHA's standard references ANSI Z87.1, *American National Standard Practice for Occupational and Educational Eye and Face Protection* at §1926.102(b). Protective eye and face protection devices must comply with 2010, 2003, or 1989 editions of the standard.

HAND PROTECTION

At §1926.95(a), OSHA requires employers to provide workers with extremity protection — such as gloves for hands. For example, gloves must be worn when employees' hands are exposed to hazards such as skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.





OSHA does not reference any industry consensus standard for hand protection. §1926.28(a) states, "the employer is responsible for requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions or where this part indicates the need for using such equipment to reduce the hazards to the employees."

You can also rely on the glove manufacturer to help educate you on both benefits and drawbacks of the hand protection you need to protect your employees effectively. This information can also be used to train employees on the proper use, fit, and maintenance of gloves.

FOOT PROTECTION

Require the use of protective footwear when your employees are working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, or when the use of protective footwear will protect the affected employee from an electrical hazard, such as a static-discharge or electric-shock hazard, that remains after the employer takes other necessary protective measures.

The §1926.96 standard references the 1967 edition of ANSI Z41, *American National Standard for Men's Safety-Toe Footwear*.

RESPIRATORY PROTECTION

Administrative or engineering controls must first be determined and implemented whenever feasible to control exposures to air contaminants. When such controls are not feasible, protective equipment or any other protective measures must be used to keep employee exposures within limits prescribed in the air contaminants in standard (§1926.55). Whenever respirators are used, their use is to comply with §1910.134. Remember, OSHA's construction industry requirement for respiratory devices is identical to the general industry requirement.

OSHA'S GENERAL INDUSTRY WELDING STANDARD REQUIRES EMPLOYERS TO PROVIDE WORKERS PROTECTIVE CLOTHING, SUCH AS FR CLOTHING, WHEN EXPOSED TO FLASH FIRES DURING WELDING OPERATIONS.

SELECT NIOSH-CERTIFIED RESPIRATORS.

The employer must:

- Select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and jobsite and user factors that affect respirator performance and reliability.
- Select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.
- Select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to and correctly fits the user.

FLAME-RESISTANT AND ARC-RATED CLOTHING

ASTM F1506 provides performance specifications for both FR and AR protection. OSHA 1910.269, *Electric power generation, transmission, and distribution* (269 standard), requires that employees exposed to hazards from flames or electric arcs in the power generation, transmission, and distribution industry must not wear clothing that could ignite and continue to burn or that could melt onto their skin when exposed to flames or heat energy.

OSHA's general industry welding standard 1910.252, *Welding, Cutting and Brazing*, requires employers to provide workers with protective clothing, such as FR clothing when exposed to flash fires during welding operations. Similarly, employers in the construction industry would provide workers with similar FR-rated protective clothing per 1926.28 — after determining workers' exposure to flash fire during welding activities.

OSHA also recognizes National Fire Protection Association (NFPA) standards such as NFPA 2112, *National Fire Protection Association Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*. If your workers are exposed to arc flash hazards, they'll need both FR and AR clothing. For fire-resistant clothing only, FR-rated clothing would be sufficient.

NFPA 70E, *Standard for Electrical Safety Requirements for Employee Workplaces*, is a voluntary consensus standard employers commonly reference for protection from arc flash hazards. OSHA doesn't adopt NFPA 70E or NFPA 2112.

HEARING PROTECTION

Under §1926.101, employers must make hearing protectors available to all employees "wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Table D-2, *Permissible Noise Exposures*, in § 1926.52." Employers must make hearing protectors available to all employees exposed to an eight-hour time-weighted average of greater than 90 decibels. This is the exposure level at which hearing protectors must be available.

Unlike general industry workers, construction workers are not required to have a baseline audiogram. Per §1926.101(b), "ear protective devices inserted in the ear shall be fitted or determined individually by competent persons."

Hearing protectors are given EPA noise reduction rating (NRR) numbers to indicate how much noise reduction they offer.

HIGH-VISIBILITY APPAREL

Safety vests are very common on jobsites. Certified high-visibility vests must comply with garment design requirements in ANSI/ISEA 107, *The American National Standard for High-Visibility Safety Apparel and Headwear*.

Non-certified vests aren't required to conform to this Standard but are acceptable to use in low-risk work areas. Although OSHA hasn't adopted this Standard, many state-OSHA plans have. Buying ANSI-rated high-visibility apparel may also allow an employer to demonstrate it met its duties under OSHA's General Duty Clause. When workers are exposed to motor vehicle traffic, need to be more conspicuous for safety reasons, or are working near roadways, high-visibility apparel is ideal.

WHEN WORKERS ARE EXPOSED TO MOTOR VEHICLE TRAFFIC, NEED TO BE MORE CONSPICUOUS FOR SAFETY REASONS, OR ARE WORKING NEAR ROADWAYS, HIGH-VISIBILITY APPAREL IS IDEAL.

There are three types of high-visibility vests:

- **Type R** is for roadway work, construction, and nighttime operations.
- **Type O** is for off-roadway work.
- **Type P** is used for public safety workers.

High visibility vests are further classified based on their retroreflective materials and design attributes:

- **Class 1** certified vests have the least amount of visible material but allow workers to be identified in the work area.
- **Class 2** offers increased visibility, providing more definition of the worker's form.
- **Class 3** has the most visibility, allowing workers to be recognized in complex work environments.

Besides construction applications, high-visibility apparel can be used in every industry to ensure your workers are adequately visible to others. Alternative options for high-visibility clothing include sweatshirts, jackets, coveralls, and t-shirts.

PPE MUST FIT PROPERLY AND BE COMFORTABLE

Fit and comfort can make the difference between an effective PPE program and a failed effort. OSHA's construction PPE standards don't provide employers guidance about the fit and comfort of PPE. According to OSHA's Fall 2022 regulatory agenda, OSHA is taking rulemaking activity to "clarify the requirements for the fit of personal protective equipment in construction." If PPE does not fit, it may not provide sufficient protection, and employees who find it uncomfortable might refuse to wear it.

GENERAL PPE

1926.95(c) states, “all personal protective equipment shall be of safe design and construction for the work to be performed.” OSHA’s *Women in Construction* webpage states, “PPE must fit properly so that it can effectively protect the employee from the hazard for which it was designed. Today there has been tremendous progress in the availability of PPE for women.”

OSHA suggests that employers use body measurements. Most PPE is manufactured using standardized body measurement data, aiming to fit 5-10 percent of females and 90-95 percent of males. This often leads to PPE being too small or large. OSHA recommends that female workers test PPE provided by their employer to ensure it fits properly and is comfortable. If not, they should immediately report the improperly fitting PPE to their employer.

Pay attention to any adjustable features on the PPE. Adjustments should be made on an individual basis for a comfortable fit to maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face.

Also, proper fitting of a helmet is important to ensure that it will not fall off during work operations. In some cases, a chin strap may be necessary to keep the helmet on an employee’s head. (Chin straps should break at a reasonably low force to prevent a strangulation hazard). PPE manufacturers’ instructions should be followed carefully. All protective devices must:

- Provide adequate protection against the particular hazards for which they are designed,
- Be of safe design and construction for the work to be performed,
- Be reasonably comfortable when worn under the designated conditions,
- Fit snugly and not unduly interfere with the movements of the wearer,

- Be durable,
- Be capable of being disinfected,
- Be easily cleanable, and
- Be distinctly marked to facilitate identification only of the manufacturer.

If several different types of PPE are worn together, make sure they are compatible. If PPE does not fit properly, employees could be dangerously exposed. Ill-fitting PPE may not provide the level of protection desired and may discourage employee use.

EMPLOYEES MUST BE KNOWLEDGEABLE ABOUT USING PPE

Employees have to know how to use the equipment. The training requirements in OSHA's general rule on PPE apply only to protective clothing along with:

- Eye and face protection,
- Head protection,
- Foot protection, and
- Hand protection.

EMPLOYEES MUST RECEIVE TRAINING PRIOR TO USING PPE.

One of the unique aspects of the training requirements is that, before employees can be allowed to do work requiring PPE, they have to demonstrate an understanding of the training and the ability to use the equipment properly.

Fortunately, this is not too much of a burden because employees usually have to try on and adjust PPE to find the right size and to get a good fit. This is an ideal time to have them demonstrate that they can use the equipment properly. Focus on:

- When PPE is needed.
- What PPE is needed.
- How to put on, take off, and adjust the PPE.
- Limitations of the equipment.
- Care, maintenance, useful life, and disposal of the PPE.

These topics give workers a solid understanding of why it is important to take PPE use seriously. After the training, they will know how to handle and use the equipment properly.

CONCLUSION

Your PPE program is one of the most visible safety programs you have. Proper use of PPE sets a tone of compliance that employees, visitors, and OSHA compliance officers will notice. To get employee buy-in for the program:

- Conduct a thorough hazard assessment to ensure you have identified all situations that require the use of PPE.
- Implement appropriate control measures to eliminate the need to wear PPE when possible.
- Meet your PPE payment obligations.
- Select the right PPE for the job.
- Ensure the PPE fits comfortably.
- Provide thorough, understandable training.
- Have consistent, fair enforcement of jobsite PPE rules.
- Treat temporary workers the same as you treat your employees.

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ABOUT THE AUTHOR

RAY CHISHTI, EDITOR
J. J. KELLER & ASSOCIATES, INC.

Ray Chishti joined J. J. Keller & Associates, Inc. in 2017 as a Workplace Safety Editor. Before joining J. J. Keller, Ray worked as an EH&S professional in auditing, management, and executive leadership positions with new construction, operating facilities, and large EPC projects valued between $1 million and $2 billion. He has over 18 years of EH&S experience in a variety of industries, including fossil fuel power plants and utility distribution and transmission work. Ray's experience also includes safety responsibilities in retail grocery stores, warehouse facilities, and construction of a college campus. He holds a Juris Doctor with a concentration in Occupational Safety and Health. Ray is also an OSHA-authorized trainer for general industry and construction and holds first aid, AED, and CPR certifications.

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