

Occupational Safety & Health

A Guide to Safety Footwear Regulations

Good shoes make better employees.

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Outfitting employees with appropriate footwear reduces injuries. Protecting employees' feet with good industrial footwear cuts lost work hours, improves productivity, and heightens morale.

To abide by federal regulations adopted and enforced by the Occupational Safety & Health Administration (OSHA), protective footwear is required for workers in industrial settings. OSHA has an abundance of rules and regulations regarding workplace safety, including section 29 CFR 1910.136 on occupational foot protection.

Footwear is included in the Personal Protective Equipment section of the Occupational Safety and Health Standards. The section on foot protection points to issues relevant to employers in the construction, industrial, government and service fields.

Why is the OSHA Safety Footwear Regulation Important?

Failure to comply with OSHA regulations invites warnings, sanctions, and fines. While certain citations can be at a minimum of a few thousand dollars, it is important to note OSHA raised its maximum penalties at the start of 2018 to \$12,600 for "serious" and "other-than-serious" violations and to \$12,934 each day for "failure-to-abate" violations. In addition, "willful" and "repeat" violations can now carry a maximum of \$129,336.

Also, according to the most recent data from the U.S. Bureau of Labor Statistics, the workforce suffered approximately 100,000 occupational foot injuries in 2016 that averaged 10 days away from work. If you add up the cost of OSHA fines plus the loss in productivity caused by an injury, not to mention potential workers' compensation as well as the possibility of an additional hire, lack of foot protection can become very costly to a company.

What are the Standards?

The federal government's standard, 29 CFR 1910.136(a), is clear: "The employer shall ensure that each affected employee uses protective footwear when 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."

OSHA suggests protective footwear be worn in situations involving the following:

- corrosive or poisonous materials
- electrical hazards
- static electricity that could cause an explosion
- heavy objects that could roll onto feet
- sharp objects that could puncture the foot
- molten metal that could splash onto feet
- hot or slippery surfaces

OSHA recommends conducting an assessment—either by a company's safety personnel or by a consultant—to determine the need for PPE equipment and the type of footwear employees should wear.

Although OSHA dictates the use of PPE, ASTM International is the organization that sets the performance requirements for protective footwear in the United States. ASTM International is a leader in developing and publishing technical standards for a wide range of products and is recognized globally as a dominant and respected standards organization. It is a requisite for safety footwear in the United States to comply with ASTM. Every five years, committees of experts review the standards to ensure they are comprehensive and up to date, revising if necessary, to meet the evolving needs of industries and consumers. The most current safety footwear standard was just released in 2017.

What Do the Standards Mean?

Protective footwear must comply with the ASTM International standard F2413 (current version: F2413-17). This is the Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear. ASTM International standard F2412 (current version: F2412-18) is the Standard Test Methods for Foot Protection. Both standards are under the jurisdiction of ASTM Committee F13 on Pedestrian/Walkway Safety and Footwear.

ASTM International standards set forth minimum requirements for the performance of footwear to provide protection against a variety of workplace hazards. One such hazard is "impact," indicative of falling or dropping objects onto the foot. A weight of 50 pounds is dropped from an approximate height of 18 inches, delivering 75 ft-lbs of force onto the toe of the shoe. Test results meeting the performance criteria allow the shoe to be labeled as I/75.

Resistance to "compression" provides protection from rolling objects. A shoe that withstands 2,500 pounds of force onto the toe can be labeled as C/75.

ASTM F2413 requires compression- and impact-resistant shoes to have built-in toe caps (i.e., the safety toe caps are not removable). These shoes must be labeled as I/75/C/75. Beyond compression and impact resistance, shoes required for different types of jobs will reflect their own specific list of standards. For example, a shoe buyer might find an ASTM-certified product with the following designation:

ASTM F2413-17

M/I/75/C/75

Mt/75

What does this mean? The first line communicates that the shoe meets the ASTM F2413-17 standard. In the next line, the M stands for male, the I/75 stands for the impact rating, and the C/75 is the compression rating. The third line, Mt/75, indicates metatarsal protection of 75 ft-lbs of force. Refer to the following list of rating abbreviations:

- C/75 = Compression rating
- I/75 = Impact rating
- Mt/75 = Metatarsal rating
- CD = Conductive properties
- EH = Electrical hazard properties
- SD 100 = Static dissipative (1-100 megohms)
- SD 35 = Static dissipative (1-35 megohms)
- SD 10 = Static dissipative (1-10 megohms)
- PR = Puncture resistant
- M = Footwear designated for a male
- F = Footwear designated for a female

Safety and health experts recommend employers require employees to wear ASTM-compliant shoes because add-on protective devices, such as strap-on toe caps, often fit awkwardly over street shoes and can make walking difficult, even hazardous in certain conditions. Employees also can forget to put them on. When toe protection is needed, a safer approach for everyone in an industrial setting is to wear ASTM F2413-17 conforming shoes.

Select the Right Shoe for the Job

Each industry requires safety shoes designed to confront specific dangers. For example, safety toe shoes are needed for jobs in the construction industry where the danger of heavy objects dropping on workers' feet is a daily concern. Heat-resistant soles protect feet against hot surfaces in paving, roofing and hot metal industries. Electrically conductive shoes protect against the buildup of static electricity to reduce the risk of a spark causing a fire or explosion (and should not be worn with nylon, wool, or silk socks). Electric hazard shoes prevent a wearer from

completing a circuit with the ground. They are meant as a secondary source of electric hazard protection to the wearer against the hazards of stepping on live electrical circuits, electrically energized conductors, parts or apparatus. The shoes are capable of withstanding the application of 18,000 V at 60 Hz for 1 minute, with no current flow or leakage current in excess of 1.0 mA under dry conditions. Electrical hazard protection is severely deteriorated in wet conditions.

It is important to understand the unique hazards of what your job entails and wear the appropriate footwear. Safety is rarely a one-size-fits-all endeavor. Fortunately, shoe manufacturers and retailers can guide workers to the appropriate pair of shoes for their jobs. The more dangerous the position, the more likely the shoe will be created for a narrower range of challenges. Consider the fact that firefighters select from product lines created just for them (and regulated by a separate NFPA standard), while electrical-hazard shoes are designed specifically for workplaces where there is a risk of stepping on live wires.

Additional Recommendations

Check safety shoes at regular intervals to determine whether they should be replaced or, at a minimum, cleaned. Any time a heavy object hits a safety toe, the boot's toe could be compromised and needs to be replaced. Pieces of metal or other contaminants embedded in shoe soles should be removed immediately. Shoes should be regularly cleaned and maintained for both safety and increased longevity.

For employers who want to ensure that they comply with applicable regulations, OSHA offers training opportunities and guidance through grants, strategic partnership programs within trade unions and associations, voluntary protection programs, and free consultation assistance for small employers. These resources are detailed on OSHA's website.

Employers must conduct a workplace hazard assessment and direct workers to find and wear work boots that meet relevant ASTM standards and are suitable for their jobs. Businesses have several choices that will help employees avoid foot-related injuries. ***Fulfilling OSHA's mandate is more than just about meeting a governmental obligation—it is about protecting the lives of employees and maintaining their safety in the workplace.***

As with so many things in life, safety first. The cost of a pair of safety shoes is small compared to a foot injury that can put an employee out of work for days or weeks, as well as cause permanent disability or worse. Injury can result in thousands of dollars of workers' compensation fees and lost productivity. Protective footwear provides a vital layer of protection for a company's most valuable asset, its employees.