



# CONNNEY® SAFETY

A DIVISION OF WESCO DISTRIBUTION, INC.

## Foot Protection Ready Reference

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### 1. The Law

#### **A. OSHA 29 CFR 1910.136**

- This standard states: “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, and where such employee’s feet are exposed to electrical hazards.”
- Deciding when and what kind of footwear employees need to wear is solely the employer’s responsibility
- Protective footwear purchased after July 5, 1994 shall comply with ANSI Z41-1991
- According to OSHA, questions most often arise about the acceptability of add-on toe guards as opposed to traditional steel toe footwear. Add-on toe guards are acceptable. However, OSHA would require the employer to show compliance documentation of the add-on toe guards.

#### **B. ASTM F2412-11 and ASTM F2413-11**

- On March 1, 2005, the ANSI Z41 reference was withdrawn and replaced by the ASTM Standards. On September 9, 2009, OSHA issued an update to its PPE standards. The final rule went into effect in October 2009. This final rule revised the PPE sections of OSHA’s general industry, shipyard employment, longshoring and marine terminals standards regarding requirements for eye and face protective devices, and head and foot protection.
- As used in this standard, footwear means footwear designed, constructed, and manufactured with a protective toe cap, that is specifically designed and manufactured to meet the performance requirements of this standard. However, protective footwear may include other types of protection for the user, such as protective footwear manufactured with metatarsal guards, electrostatic dissipative footwear, conductive footwear, electrical hazard footwear, and sole puncture resistant footwear.
- Where steel can be found in ASTM-compliant footwear:
  - **Steel Toe** – Built-in steel toe caps will meet or exceed ASTM F2413-17 I/75 C/75 for impact and compression
    - I/75 – Impact tested at 75 lbs. impact
    - C/75 – Passed compression test at 75 lbs. of compression
  - **Steel Midsole** – Will cover the bottom of the sole to prevent punctures to the bottom of the foot
  - **Steel Shank** – Found on most safety footwear, this steel plate bridges the heel to the middle of the foot. It aids in comfort while working and for when climbing ladders or shovel work.
  - **Steel Metatarsal** – Protects the top bones of the foot. It can be built into a chemical-resistant boot, it can be a tongue-flap on leather lace-up shoes, or it can be added separately to lace-up work boots.

## C. ASTM F1117

- American Society for Testing and Materials is one of the largest voluntary standards development organizations in the world
- We offer Dielectric Overshoes which conform with ASTM F1117 and are tested to ASTM F1116 at 20kV (20 kilovolts)
- Dielectric boots and overshoes meeting this standard are commonly used by electricians and others working around and near high voltage

## 2. The Essentials

### A. What Are the Most Common Foot Hazards in the Workplace?

- **Falling and Rolling Objects, Cuts, and Punctures** – Injuries could include crushed or broken feet, amputations of toes or feet, punctures of feet or toes
- **Protection**
  - Steel or composite toes safety footwear, metatarsal guards, puncture-resistant footwear
  - Shoes should be ASTM F2413-05 compliant
- **Chemicals, Solvents** – Injuries could include chemical burns, skin irritation, and exposure
- **Protection**
  - Rubber, vinyl, neoprene, nitrile, polyurethane, or other synthetic chemical resistant oversock or overshoe type boot
  - Check chemical-resistant guide for selection.
- **Electrical Current, High Voltage** – Injuries could include electrical shocks or fatal electrical exposure
- **Protection**
  - Safety footwear should incorporate an electrical hazard (EH) protective sole and heel
  - The sole should be designed to reduce hazards from contact with electrically energized parts. It also should provide a secondary electrical hazard protection on substantially insulated surfaces.
  - Footwear should be designed to provide protection from open circuits of 600 volts or less under dry conditions. Properties should include the ability to withstand 14,000 volts (rms) at 60 Hz for one minute with no leakage in excess of 3.0 milliamperes.
- **Extreme Cold** – Injuries could include frostbite and permanent tissue damage or loss
- **Protection**
  - Insulated footwear that captures the body's heat, preventing it from escaping
  - Footwear that is waterproof or water-resistant, to prevent wetness and cold
- **Slips, Trips, and Falls** – Injuries include falls, back sprains, ankle sprains, and disabling injuries
- **Protection**
  - Safety shoes with soles that are non-slip rubber, urethane, or crepe
  - Footwear that wraps around and laces tight around the ankle to prevent sprains and twisting
- **Wet Environments** – Injuries could include slips and falls, back sprains, ankle sprains, strains, etc.
- **Protection**
  - Lined rubber boots with waterproof characteristics
  - Safety shoes with soles that are non-slip rubber, urethane, or crepe

### B. What Are Boots Typically Constructed Of?

#### Rubber

- Very flexible and a good grip, especially in cold temperatures
- Primarily used as an outdoor or hazmat overboot
- Not appropriate for use around animal fats or solvents

### **Vinyl**

- Resistant to a broad range of chemicals
- Inexpensive, used in industries where cost is critical and turnover is great

### **Neoprene**

- Expensive, but very resistant to chemicals/acids
- Resists fats and greases very well
- Soft sole is very slip-resistant
- Used primarily in dairies and meat-packing plants where slips, trips, and falls are a problem

### **Nitrile**

- Less expensive than neoprene, but not as slip-resistant
- Very resistant to fats, greases, and solvents
- Very abrasion resistant,
- Used especially in poultry and other meat-packing plants

### **Polyurethane**

- Very expensive, but extremely lightweight and slip-resistant
- Resistant to fats, greases, and chemicals
- Very abrasion resistant
- Used by meat processors and others who want a durable, quality boot

### **Synthetics blends**

- Various combinations of blended materials
- Usually very lightweight (some feel like “Crocs” brand of footwear)
- Can be used in multiple applications for chemical resistance

### **Disposables**

- Vinyl, rubber, and polyethylene disposables can be worn for various wet applications
- Tyvek and polypropylene disposables, can be used for dirt and light spraying applications

## **C. What Are the Different Types of Sole Patterns?**

Tread patterns are an important step in selecting boots based on the work application. You should look at both the tread pattern and the sides of the sole to see how easy debris can be pushed out of the channels.

- **Chevron or Ultragrip Soles** are referred to as self-cleaning soles because they clean themselves while you walk. They are commonly used in cheese and meat-packing applications where food products get stuck in the sole.
- **Safety-Loc Soles** are an excellent gripping sole used primarily in wet floor and dairy applications, where a self-cleaning sole is not needed. They provide traction on wet, solid floors with little debris.
- **Cleated Soles or Lug Soles** are general industry soles that are multi-purpose. They are more commonly used outside, as mud can be channeled out the sides easier.

## **D. How Common Are Foot Injuries in the Workplace?**

- More than 60,000 foot injuries per year result in lost work days
- 75% of the injuries occurred when workers were not in compliance
- The average cost of a lost work day foot injury is \$9,600
- 80% of all footwear injuries are caused by an object weighing 30 pounds or less impacting the foot

## **E. How Does Sizing Work for Women’s Footwear?**

- When a woman orders a men’s size shoe, she should choose a size 2 sizes smaller than she would for a women’s shoe. For example, if she wears a women’s size 10, she should order a men’s size 8.

#### **F. What is the Benefit of a Composite Toe?**

- Since a composite toe cap does not contain metal, boots with composite toes are more comfortable when working outdoors, or in extreme temperature conditions of heat or cold.
- Composite toes have significantly better electrical resistance than steel toes. If you're an electrician or work a job where you're regularly around live wires, composite toes are a much better option.
- Composite toes are lighter than steel toes.

#### **3. Product Reference**

- A. Insoles - For shoes or boots
- B. Studs/Grippers – For icy and slippery conditions
- C. Shoe Caps/Metatarsal Guards
- D. Shin and Leg Guards
- E. Dielectric Overshoes