SAFETY GUIDELINE
Foot Protection

Policy

The University of Nebraska Medical Center (UNMC) aims to minimize the risk of foot injuries to personnel. To accomplish this, appropriate foot protection must be worn whenever there is a risk of injury to the foot 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 department takes other necessary protective measures.

Foot protection must meet the requirements specified in the most recent American Society for Testing and Materials (ATSM) standards:

- Standard Test Methods for Foot Protection (ASTM F-2412)
- Standard Specification for Performance Requirements for Protective Footwear (ASTM F-2413).

Principal Investigators (PIs), department managers and supervisors are responsible for ensuring that each affected employee wears appropriate protective footwear when working in areas with a potential for injury to the foot. Protective footwear requirements are common for laboratories, warehouses, landscaping, machine operation, construction, welding, manufacturing, and food service.

Hazards to Consider

- Impact from heavy objects that could fall or roll onto the feet
- Compression from equipment and objects that could crush, penetrate, pinch, or roll over the foot
- Sharp objects that could puncture the foot
- Electrical hazards and static electricity that could conduct energy to the employee
- Hot surfaces and hot materials that could splash onto or contact the foot
- Slippery surfaces
- Corrosive or poisonous chemicals and hazardous materials

Foot Protection Types

Safety-toed Boots or Shoes: Footwear that protects against impact and compression hazards from falling, crushing, or rolling objects.

Composite Toe Boots or Shoes: Footwear made of non-metallic fibers like Kevlar® that do not conduct electricity. Composite toe footwear does not offer the same impact and compression protection as steel-toe footwear.

Alloy Toe Boots or Shoes: Footwear is made of materials like aluminum and titanium, making them lighter than steel-toe boots. This footwear offers more room in the toe box due to thinner metal plates. Alloy toe footwear should not be worn when electrical hazards are present.

Steel Toe Boots or Shoes: Footwear made with steel that provides stronger impact protection and sheer resistance than alloy toe footwear. The thicker steel plates may cut into employees' feet and be heavier to wear. Steel toe footwear should not be worn when electrical hazards are present.

Puncture-Resistant Boots or Shoes: Footwear that protects the midsole of the foot where sharp objects can penetrate or pierce the shoe's sole.

Slip-Resistant Boots or Shoes: Footwear that protects from slip and fall hazards when working in areas with wet, oily, or greasy floors.

Chemical-Resistant Boots, Shoes, Overshoes, and Booties: Footwear that protects from chemical, biological, and hazardous materials. The material that the footwear is constructed of must be compatible with the chemicals and hazardous materials being used.

Leggings: Protects the lower legs and feet from heat hazards when working around molten metal, welding sparks, and other high-temperature materials.

Metatarsal Guards: Guards that can be affixed to the outside of regular work shoes and protect the instep area of the foot from impact and compression hazards.

Toe Guards: Guards that fit over the toes of regular work shoes and protect the toes from impact or compression hazards.

Static Dissipative (Conductive) Boots or Shoes: Footwear that minimizes the buildup of electrical charge between a person and the surfaces/environment around them by conducting the charge through the shoes to the ground. They are commonly used when working with flammable liquids, explosives and in the manufacturing of electronic components.

Electrical Hazard (EH) (Non-Conductive) Boots or Shoes: Footwear that provides protection from electrical hazards and are electrical insulators to prevent or reduce the flow of electrical current from the feet to the ground. EH rated footwear can prevent electric shock from contact with a live conductor.

Dielectric Electric Overshoes: Footwear that provides a barrier to protect personnel from open electrical sources such as touching or stepping on an energized conductor. They are commonly used when performing equipment grounding near power lines or when working on or around live power.

Waterproof Boots and Shoes: Footwear that protects the feet in wet conditions and keeps them dry and comfortable.

Rubber Overshoes: Footwear that protects when working in high water levels or during concrete work.

Thermal Insulated Boots or Shoes: Footwear that protects in high heat and cold temperatures and harsh outdoor environments.

Studded Treads and Overshoes: Footwear that protects from slip and fall hazards when working in areas with ice or snow-covered ground. Studded footwear should not be worn on hard surfaces other than ice or snow.

Selection of Foot Protection

Safety shoes or boots must be ASTM-certified. Protective standards marked on footwear will include ASTM 2413-11 or ASTM 2413-18. They must have a leather upper, non-skid soles, built-in toe caps, oil resistance, and impact and compression resistance ratings of 75. They may also be tested for puncture resistance, metatarsal protection, static dissipation, electrical hazard resistance, or conductive protection.

Below are symbols that are used to indicate protection offered by the footwear:

- M or W: Men’s or women’s
- I: Impact
- C: Compression
- MT: Metatarsal protection
- PR: Puncture resistance
- CD: Conductive protection
- EH: Electrical hazard resistance
- SD: Static dissipative

The table below provides general guidance for the proper selection of foot protection:

Activity	Foot Hazards	Foot PPE
Lab work, pesticide application, fueling equipment, chemical and hazardous material handling, hazardous material spill clean-up	Chemical, biological, and other hazardous materials	Chemical protective or resistant shoes, boots, or shoe covers
Construction, demolition, renovation, plumbing, building maintenance, trenching, utility work, materials handling	Impact, compression	Safety toe shoe or boot (composite, alloy, steel toed)
Moving heavy equipment (forklifts, aerial lifts, pallet jacks, heavy carts), moving heavy materials (drums, large cylinders, lumber, large pieces of metal or wood), working around large animals, heavy pipes, skid trucks, jackhammering, breaking pavement, steel or iron work	Severe impact or compression to the top of the foot	Safety toe shoe or boot with metatarsal protection
Kitchen work, icy surfaces, wet surfaces, or any other slippery surfaces	Slippery surface	Slip-resistant boots, shoes, ice cleats, or spikes
Snowplow and snow clearing operations, outdoor animal care, working with molten metal, welding operations, foundry work	Extreme heat or cold	Thermal insulated safety boots or shoes and/or leggings
Chainsaw, pole saw, lawn mowing and maintenance, and blade and string trimming operations	Cuts, abrasions	Kevlar or cut-resistant safety shoes or boots
Electrical work greater than 50V AC or DC, installation of electrical equipment, equipment grounding, and contact with live conductors	Electrical shock	Electrical hazard safety toe shoes or boots
Working on electronics, computer components, solvent-based paints, explosives	Electrical shock	Static dissipative shoes or boots
Working with flammable liquids, explosive material, and spray painting	Explosion	Conductive protection safety shoes or boots

Comfort, Fit, Maintenance, and Storage

When selecting proper protective footwear, comfort and fit are critical.

- Proper Size: Enough room in the toe box to allow for toe movement without pinching. The heel should fit snugly to prevent slippage.
- Width Selection: A width that accommodates the natural shape of the wearer's foot to prevent pressure points.
- Sock Consideration: Protective footwear should be tried on with the same type of socks worn at work to ensure a proper fit.
- Flexibility: The footwear should flex naturally at the ball of the foot to allow for comfortable movement.
- Weight Distribution: Heavier boots can lead to fatigue and injuries.
- Support: Adequate arch support and cushioning to minimize foot strain.

Employees must follow the manufacturer's guidelines for proper use, maintenance, and storage of protective footwear.

- Protective footwear should be stored in a cool, dry place with good air circulation, away from direct sunlight.
- Protective footwear should be cleaned regularly to remove dirt and debris.
- Protective footwear must air dry completely prior to storage after exposure to moisture.
- Protective footwear should be routinely inspected for cuts, holes, tears, cracks, worn soles, and other damage that could compromise the protective features.
- Protective footwear required for specific hazards (electrical, chemical, or hazardous material resistance, etc.) should be inspected prior to each use.
- Damaged or defective protective footwear must not be worn and should be replaced immediately.

Training and Issuance

Principal Investigators (PIs), department managers and supervisors are responsible for determining and providing the appropriate foot PPE and training on PPE needed for processes conducted. Employees are responsible for inspecting their foot PPE before and after use, reporting any defects or damage to their supervisor, wearing PPE as instructed, and maintaining and storing PPE appropriately.

PPE training should be documented, and a copy of the training record should be available upon request. Please review the Personal Protective Equipment (PPE) Training & Issuance Record for additional information.

Additional Resources

OSHA 29 CFR 1910.136
OSHA 29 CFR 1910 Subpart I Appendix B

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