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1.0 Purpose

1.1 The EHS SOP for foot protection was developed in accordance with the University's Policy Statement on Health and Safety and to ensure compliance with all applicable legislation.

1.2 In workplaces, falling or rolling objects, sharp objects, exposed energized electrical conductors, chemical or corrosive contact, burns, hot or cold environments or other hazards can create a potential for foot injury. To protect against those hazards that continue to exist after all control measures have been implemented, appropriate protective footwear must be used.

2.0 Applicability

2.1 This SOP applies throughout the University and all off campus sites. This SOP also applies to all faculty, staff, contractors and students who are undertaking studies, doing research, or carrying out any other work that takes place off-campus and is under the purview of the University.

3.0 Applicable Legislation

Occupational Health and Safety Act, 91-191, sec.41
Canadian Standards Association (CSA) Z-195 – M92
Canadian Standards Association (CSA) Z-195.1-02 Guidelines on selection

4.0 Responsibilities

4.1 **Directors, Department Heads, and Managers** have the responsibility to identify situations where foot protection is required and in conjunction with EHS determine type of protective footwear required for the hazards present. Ensure SOP is implemented in all facilities under his/her control. Ensure all pertinent supervisors, employees and students have been made aware.

4.2 **Supervisors** must be knowledgeable about the hazards in their area and ensure all staff and students are aware of the hazards and informed of footwear requirement and care.

4.3 **Staff and Students** must wear protective footwear at all times in areas where a foot hazard exist. They must also maintain footwear in good condition.

5.0Types of Footwear Protection

Injuries to the foot may be prevented by the use of appropriate protective footwear. Appropriate protective footwear must protect against the specific hazards presented, provide a comfortable and secure fit, and comply with CSA Standards Z195-02 and Z195.1-02. CSA approved protective footwear will have markings at ankle height outside right upper or tongue of the boot/shoe (Appendix 1).

- **Protective Toe Cap** – a shield incorporated into a boot or shoe which provides protection against impact to the toes. Protective toe caps must be worn by those

exposed to potential impact injury to the toes. There are two grades of toe caps; Grade 1, withstands equivalent of 50 lb object dropped at a height of 22"; Grade 2, withstands 50lbs at 16"

- **Protective Sole** – a plate incorporated into the sole of a boot or shoe that provides protection against penetration of sharp objects into the bottom of the foot. Footwear with protective soles must be worn by those who are exposed to potential puncture injury.
- **Metatarsal Protector** – a shield over top of the foot, attached to the shoe or boot, which provides protection against impact to the metatarsal area of the foot. Footwear with metatarsal (top of the foot between the toes and ankle) protection must be worn by those who are exposed to potential impact injury to the metatarsal.
- **Electric Shock-resistant Sole** – a sole constructed of electrically insulating materials which provide protection against electric shock to the bottom of the foot. Electric shock resistant soled footwear must be worn by those who may be exposed to potential live electrical conductors.
- **Static Dissipative Footwear** – a boot or shoe that incorporates a sole that allows a small charge of electricity to be dissipated into the walking surface. Static dissipative footwear may be required in some workplaces such as flammable or explosive materials are present or where the buildup of static electricity must be minimized.
- **Conductive Sole Footwear** – a boot or shoe that incorporates a sole that is constructed of a conductive material designed to electrically ground the foot. Conductive sole protective footwear must be worn in workplaces where there is a hazard of static ignition. In addition to wearing conductive sole footwear, all containers and equipment in the area should be grounded.
- **Chainsaw Protective Footwear** – a boot designed to prevent a chainsaw from cutting into the shin, ankle, foot and toes.

Inside Protection Code

A 5-place alphanumeric code indicates the protection offered by the footwear:

1	P	M	E	X

Position 1 - level of toe protection (1 for Grade 1, or 2 for Grade 2, 0 if not)
Position 2 – presence of puncture-resistance sole (P if present, 0 if not)
Position 3 – metatarsal protection proved (M if present, 0 if not)
Position 4 – electrical protection (E if shock resistant, S if static dissipative, C if conductive, 0 if not protected)
Position 5 – chainsaw protection (X if protected, 0 if not)

6.0 Other Protection

Shoe materials, including soles and uppers, must be compatible with the work environment and the tasks conducted. Depending on the potential hazards encountered in the workplace, workers may be required to wear footwear which provides further specific protection. This may include footwear made with soles that are resistant to slip, abrasion, oils, chemicals, or heat. Manufacturers of individual footwear can provide data on the performance of their specific products against these hazards and should be consulted when selecting appropriate protective footwear. Appendix 3 provides a summary of the general resistance properties of a variety of sole materials.

7.0 Protective Footwear in Chemical, Radioactive and Biohazard Laboratories

Appropriate protective footwear must be worn at all times in laboratories where chemicals, radioisotopes or biohazardous materials are used and stored. Perforated shoes, sandals and the like must not be worn in these laboratories. Appropriate shoes must cover and protect the entire foot (toes, heels and top of foot). Shoe materials, including soles and uppers, must be compatible with the laboratory environment, the materials be handled, and the tasks conducted.

Depending on the types of hazards in the laboratory, footwear which provides additional protection may be warranted. Shoes with soles that are resistant to slip, abrasion, oils or heat may need to be considered. Where the potential exists for foot injury due to impact, puncture, electrical shock, or static electricity, appropriate CSA-approved footwear must be worn.

8.0 Hazard Assessment

Prior to the selection of protective footwear, a hazard assessment and analysis should be conducted. This assessment is based upon the workplace environment and specific work activities. The following potential hazard areas should be considered:

- Materials normally handled:
    - Risk of objects falling onto or striking feet
    - Material or equipment that may roll over feet
    - Sharp or pointed objects that may cut the top of feet
- Objects that may penetrate bottom or side of feet
- Exposure to corrosive or other irritating substances
- Exposure to explosive atmospheres: evaluate static risk
- Risk to sensitive electronic equipment
- Risk of contact with low to moderate voltage
- Risk to ankles from uneven environment
- Risk to feet from extreme weather/surfaces
- Risk of slip and fall on slippery surfaces
- Exposure to water or other liquids

- Exposure to cutting or grinding machinery (chainsaw, grinders)

9.0 Selection Guide

After completing the hazard assessment, refer to Appendix 2, which identifies the recommended footwear selections for various workplace hazard categories. It also indicates types of footwear that are not recommended for certain hazardous situations.

For example: if your workplace assessment indicates the following hazards:

- Uneven work surface
- Falling objects
- Sharp objects on the ground
- Live electrical conductors

You would select a boot which gives ankle support, with both a green triangle and a white rectangle label. The inside protection code on the boot would be **1PME0** which indicates Grade 1 toe protection, puncture resistance sole metatarsal protection, and electrical protection.

Protective Footwear Markings **Appendix 1**

Selection of Safety Footwear		
Marking	**Criteria**	**Intended Application**
	Green triangle indicates sole puncture protection with a Grade 1 protective toecap.	For heavy industrial work environments, especially that of construction where sharp objects (such as nails) are present.
	Yellow triangle indicates sole puncture protection with a Grade 2 protective toecap.	For light industrial work environments requiring puncture protection as well as toe protection.
	Blue rectangle indicates a Grade 1 protective toecap with no puncture-resistant sole.	For industrial work environments not requiring puncture protection.
	Grey rectangle indicates a Grade 2 protective toecap with no puncture-resistant sole.	For industrial and non-industrial work environments not requiring puncture protection.
	White rectangle with orange Greek letter omega indicates electric-shock protective footwear.	For industrial work environments where accidental contact with live electoral conductors can occur. **Warning:** Electrical shock resistance deteriorates with wear and in a wet environment.
	Yellow rectangle with black SD letters indicates static-dissipative footwear.	For industrial work environments where a static discharge can create a hazard for workers or equipment. **Warning:** This footwear should not be used where contact with live electrical conductors can occur.
	Yellow rectangle indicates sole puncture protection with a Grade 2 protective toecap. (super-static dissipative footwear)	For industrial work environments where a static discharge can create a hazard for workers or equipment. **Warning:** This footwear should not be used where contact with live electrical conductors can occur.

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	Red rectangle with white C letter indicates electrically conductive footwear.	For industrial work environments where low-power electrical changes can create a hazard for workers or equipment. **Warning:** This footwear should not be used where contact with live electrical conductors can occur.
	Dark grey rectangle with M letter indicates metatarsal protection. **Note:** Toe protection is required for all metatarsal protective footwear.	For industrial work environments where heavy objects can hurt the metatarsal region of the foot.
	White label with green fir tree symbol footwear provides protection when using chainsaws.	For forestry workers and others who work with or around hand-held chainsaws and other cutting tools.

NOTE: Footwear will also be marked to indicate the level of slip resistance. These markings may be on the packaging, the footwear, or on a product sheet.

From www.ccohs.ca/oshanswers/prevention/ppe/footwear.html

Footwear Protection Guide

Appendix 2

Hazard Types	Protection - Hazardous Activity Examples	Protective Toe	Protective Sole	Metatarsal Protection	Electrical Insulation	Static Dissipation	Conductive Sole	Chainsaw Protection	Comments
Falling Objects	-Construction sites -Handling heavy materials, equipment or machinery -Machine shops -Woodworking shops	**HR**		**HR**					Metatarsal guards are recommended where heavy objects may fall on foot
Rolling Objects	-Construction sites -Handling heavy materials, equipment or machinery -Machine shops -Woodworking shops	**HR**		**HR**	**R**				Select Grade 1 toe protection
Sharp Objects	-Construction sites -Presence of sharp objects on ground -Machine shops	**HR**	**HR**	**HR**					Protect against sharp objects penetrating sole and top of foot
Electrical Shock	-Presence of live electrical conductors -Construction sites				**HR**	**X**	**X**		SD and conductive footwear offer no protection
Static Discharge	-Handling of sensitive electronic equipment				**X**	**HR**			Insulating footwear is hazardous to circuits
Static Ignition	-Presence of flammable or explosive materials -Handling of sensitive electronic equipment				**X**		**HR**		In addition, ground all containers and equipment
Saw Cutting	-Construction sites -Cutting timber	**HR**	**R**	**R**				**HR**	Select footwear for environmental conditions

HR – Highly Recommended **R** – Recommended **X** – DO NOT USE

Performance Ratings of Footwear Soles **Appendix 3**

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Sole Material	Resistance Properties E = Excellent G = Good F = Fair P = Poor								
	Abrasion	**Metal Chips**	**Chemical**	**Cushion**	**Cement**	**Slipping**	**Water**	**Oil**	**Heat**
Blown Rubber	G	F	E	E	E	G	G	G	F
Vulcanized PVC	G	G	F	G	G	F	G	G	G
Vibram	E	E	G	E	E	E	E	G	E
Leather	F	F	F	G	G	G	P	F	P
Vinyl Flex	G	F	F	E	E	E	G	G	F
Chemigum	E	G	G	E	E	E	E	E	E
Neoprene	E	G	E	G	E	G	E	E	G
Krayton	E	F	F	E	G	G	G	F	F
Neo Crepe	G	F	F	E	G	E	G	G	P
Rubber	E	G	G	E	E	G	E	G	G
Nitrile	E	G	E	G	E	E	E	E	G
Dynatread	E	E	G	G	E	E	E	G	G
Sur-Sport Rubber	G	G	E	E	G	E	E	E	G
Polyurethane	E	F	E	E	E	G	E	E	G
Vylyt	F	P	E	G	G	E	E	E	F
Crepe	G	E	G	G	E	G	E	G	G

Adapted from CCOHS and Quenn's Department of EHS