

SUBJECT: PROTECTIVE CLOTHING & EQUIPMENT**1. Purpose**

Personal protective equipment is worn to protect the body from exposure to hazardous materials or conditions. These include, but are not limited to, heat; cold; abrasion; puncture; sharp, falling or thrown objects or other harmful contacts; excessive noise or other form of radiation; accidental falls or drowning; and exposure to corrosive, reactive, toxic, flammable or infectious materials.

2. Scope

The personal wearing apparel of a worker shall be of a type and condition that will not expose him/her to any unnecessary and avoidable hazards.

All employees, students, approved visitors and employees of contractors exposed to hazardous conditions as part of their work shall wear the following basic protective clothing (except where a higher level of protection is required):

- Shirts (to the waist, over the shoulders and fully covering the underarm area)
- Long pants
- Substantial footwear (should be of a solid material that completely encloses the foot [an oxford or athletic style leather shoe, for example]; open toe or heel sandals with ventilated construction are not acceptable).

3. Authority

The Risk & Safety Manager is responsible to the Vice-President (Finance & Administration) for the administration of this policy and the development of procedures.

4. General Requirements

The minimum protective clothing in all laboratories, when hazardous materials are used, will be a fastened lab coat, that is below the knee in length, and substantial footwear. Bare legs are not acceptable when working with corrosive, reactive, toxic material easily absorbed by the skin, radioactive or infectious materials.

Material and physical hazards which must be considered when selecting clothing, gloves, footwear and eye protection include corrosiveness, toxicity, reactivity, flammability, infectious properties, radioactivity, extreme temperatures and sharp objects. Material Safety Data Sheets (MSDSs) for Hazardous Materials shall be used as guidance for determining adequate personal protective equipment.

Protective clothing and gloves shall not be worn outside the laboratory or work area. Additional restrictions may be required depending on the nature of the hazard.

4.1 Protective Clothing (Moving Machinery and Electrical Contact Hazards)

Where there is a danger of contact with moving parts or equipment or with electrically energized equipment or where the work process is such that a similar hazard exists:

- a) the clothing of employees of contractors, employees, or students shall fit closely about the body, and
- b) dangling neckwear, bracelets, wristwatches, rings, or similar articles shall not be worn, and

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- c) cranial and facial hair shall be confined, or worn at a length which will prevent it being snagged or caught in the process.

The wearing of medic alert bracelets is permitted when such bracelets are used with transparent rubber bands that fit snugly over the bracelet.

4.2 Protective Clothing (Leg Protective Devices)

Leg protective devices shall be worn by employees, students, or employees of contractors regularly operating chain saws in circumstances where a hazard of leg injury exists. Such devices shall be in conformity with the Workers' Compensation Board Personal Protective Equipment Standard 14.1, as amended from time to time or other standards acceptable to the Workers' Compensation Board.

4.3 Protective Clothing (Protection from Moving Vehicles)

Employees, students, or employees of contractors regularly exposed to the hazard of moving vehicles (parking lot attendants, flagmen, for example) shall wear a blaze red or blaze orange flagman's vest, poncho or jacket, fitted with at least one horizontal white reflectorized stripe, which shall be worn outside all other clothing.

5. Safety Footwear (General)

Except when foot guards or other protective devices affording equivalent protection are worn, all employees, students, or employees of contractors engaged in work where there is a hazard of injury to the toes, metatarsal area or soles of the feet, safety footwear shall be worn meeting the requirements of Canadian Standards Association Standard Z195 (Safety Footwear) as amended from time to time.

Safety footwear meeting the prescribed standard shall be supplied to approved visitors when visiting a work area where the visitor would otherwise be exposed to the same hazard as an employee or worker.

Footwear that has deteriorated to a point where it does not provide the required protection shall not be used.

5.1 Footwear (Laboratories)

All employees and students working in laboratories shall wear substantial footwear to protect against the hazards commonly encountered in laboratories. These hazards include chemical, biological, and radiation hazards as well as physical hazards associated with sharps, broken glassware and material handling.

Exceptions to these requirements may be permitted in laboratories equipped with electrical instrumentation only.

5.2 Footwear (Machine Shops)

All employees who work in a machine shop shall wear substantial footwear equipped with steel toes. Boots or shoes must be CSA rated with either a green or yellow triangle or square.

5.3 Footwear (Facilities Operations and Maintenance)

All Facilities Operations and Maintenance personnel shall wear safety footwear at all times meeting the requirements of the CSA Standard Z195 (Safety Footwear) as amended from time to time. Safety footwear shall be of substantial construction and protect toes of the feet from injury and be CSA rated with a green or yellow square. Specific personnel may require footwear which will also protect the soles of the feet from punctures. The Assistant Director of Facilities may

specify that a CSA green triangle designation be required on footwear worn by personnel who require puncture protection.

5.4 Footwear - Campus Planning and Development

All Facilities campus planning and development personnel whose duties may require entry into construction and renovation areas shall wear safety footwear as specified for Facilities Operations and Maintenance personnel while working at the construction or renovation site.

All construction and renovation sites shall be cordoned off so that employees, students, employees of contractors and approved visitors who are not equipped with safety footwear will not enter these areas. When such persons must enter construction areas, then barricades and dedicated walkways shall be provided to ensure equivalent protection.

Renovation work sites under the control of the Facilities Department shall be posted with signs stating:

- Construction Site
- Authorized Personnel Only
- Protective Footwear Must be Worn

Construction or renovation work conducted under contract shall also be posted. Major work sites will have barricades and signs to prohibit the entry of unauthorized persons.

All contractors working on the campus shall post the required signs and adequately barricade sites under their control.

5.5 Footwear (Shipping/Receiving and Warehouse)

All Shipper/Receiver's and Warehouse personnel shall wear safety footwear at all times meeting the requirements of the CSA Standard Z195 "Safety Footwear" (as amended from time to time). Safety footwear shall be of substantial construction and protect toes of the feet from injury and be CSA rated with a green or yellow square.

6. Protective Headwear - General

Protective Headwear shall be worn by all employees, students, approved visitors and employees of contractors in all work areas in which a potential hazard to the head exists from falling, flying or thrown objects, or from other harmful contacts.

Where employees, students, approved visitors or employees of contractors require protective headwear and are exposed to electrical hazards, they shall wear non-conductive protective headwear having resistance appropriate to the voltage involved.

All safety headgear shall meet the requirements of the Canadian Standards Association Standard Z94.1 (Industrial Protective Headwear), as amended from time to time.

Chin straps or other effective means of ensuring retention of protective headwear shall be fitted and worn when employees, students, approved visitors or employees of contractors are exposed to high winds or other conditions which might cause the loss of the protective headwear.

6.1 Protective Headwear (Motorcycles, All Terrain Vehicles, Snow Mobiles, Helicopters)

Operators and passengers of snow mobiles used in the course of work shall wear approved safety helmets and suitable eye protection. Helmet liners and cold weather face guards shall be used as appropriate in cold weather conditions.

Operators and passengers of motorcycles and all terrain vehicles used in the course of work shall wear approved safety helmets and suitable eye protection.

Protective headwear specified for snow mobile operators, motorcycles, and all terrain vehicles may be worn by personnel working about helicopters.

Where snow mobiles, motorcycles, or all terrain vehicles are employed to transport employees or students to a work point where work off the machines will expose such persons to a hazard of head injury, the protective headwear as specified under Protective Headwear - General above shall be carried and worn during that exposure.

7. Hand Protection (General)

All employees, students and employees of contractors handling materials likely to puncture, abrade, or irritate hands or arms, shall wear personal protective equipment to prevent such injuries except when the use of this equipment introduces equal or greater hazards.

Material Safety Data Sheets (MSDSs) for hazardous materials shall be reviewed for guidance on the type of glove and material it should be constructed of to provide adequate protection.

7.1 Hand Protection - Protection Against Acids, Caustics and Hot Materials

All employees, students and employees of contractors handling or using acids, caustics, steam, abrasives, hot fluid jets, or similar harmful substances, shall use suitable personal protective equipment, or other means to provide protection against these hazards.

8. Eye Protection (General)

Properly fitting goggles, face shields or other eye protective equipment (safety glasses, for example), appropriate to the work being done, shall be worn by an employee, student or contract worker who:

- a) is handling or is exposed to any material which is likely to injure or irritate the eyes, or
- b) is engaged in any work in which there is a hazard of eye injury, or
- c) has 20/20 vision in either eye or is blind in either eye.

Industrial eye protectors shall meet the requirements of Canadian Standards Association Z94.3 "Eye Protectors", as amended from time to time.

8.1 Eye Protection (Prohibition of Contact Lenses)

No employee, student, or contract worker shall wear contact lenses where:

- a) gases, vapours, or other materials are present which when absorbed by contact lenses, may harm the eyes, or
- b) dusts or other materials are present which may harm the eyes or cause distraction which may expose the employee, student, or contract worker to other injury, or
- c) persons are involved in welding operations.

8.2 Eye Protection (General Guidelines for Laboratories)

Reach for safety glasses when there is a splash hazard with a small quantity of hazardous chemical.

Safety goggles are in order when handling a liquid that is highly corrosive or in larger volume (1 litre or more).

Choose a face shield when handling very large quantities of a hazardous chemical or when there is a need to protect your face as well as your eyes.

9. Buoyancy Equipment

Every employee, student, approved visitor or contract worker working under conditions which involve a risk of drowning shall wear a personal floatation device having a buoyant effect sufficient to keep the head above water. The device shall not require manual manipulation to produce the buoyant effect.

Any personal floatation device purchased shall be in conformity with one of the following standards and be labelled in accordance with those standards:

- a) Canadian Government Specifications Board Standard 65-GP-11 for Personal Floatation Devices, Type 1 (Inherently Buoyant), as amended from time to time, or
- b) Canadian Government Specifications Board Standard 65-GP-7 for Life Jackets (Inherently Buoyant), as amended from time to time, or
- c) Conforming to Department of Transport Canada requirements.

10. Respiratory Protection (General)

Employees, students or contract employees may be exposed on a temporary or emergency basis to an oxygen deficient atmosphere or to harmful concentrations of air contaminants in the form of a gas, mist, vapour or airborne particles. Under these circumstances, they must be adequately and properly equipped with protective respiratory equipment.

Respiratory equipment is required, but not limited, to the following situations:

- a) Rooftop entry where fume hoods or hazard control systems vent onto the roof;
- b) Working with hazardous fumes, gases, mists, vapours or dusts where engineering controls are not available or practical;
- c) To escape in the event of a hazardous material release; or
- d) During hazardous material spill clean-up operations.

Protective respiratory protection shall provide adequate protection against the contaminants in the work place and shall be maintained in good working order in accordance with the manufacturer's instructions. Equipment must meet NIOSH, MSHA or other standard acceptable to the Workers' Compensation Board.

The following cartridges are available for use with half-mask and full face respirators. It is the responsibility of supervisors and instructors to ensure the appropriate selection of respiratory equipment. University employees should consult the UNBC Health & Safety Office on cartridge use:

Cartridge Type	Colour Code	Example of Uses
Organic vapour/acid gas	Yellow	Rooftop entry / lab procedures
Organic vapour only	Black	High volume solvent extraction
Dusts/particulates/aerosols	Purple	HEPA filter Toxic chemicals, aerosols
Ammonia, amines	Green	Laboratory procedures
Acid gas	Light Grey	Acid spill

Other types of cartridges are also available which address other classes of specific airborne hazardous materials (including those which can combine two of the above types).

10.1 Respiratory Protection (Pre-work Instruction)

Every employee, student, or contract worker who is required to use respiratory protective equipment shall be given pre-work instruction by his/her supervisor or instructor to understand its use, its limitations and its maintenance requirements, as far as these relate to its correct use by the employee, student or contract worker. The instruction shall include training in fit testing procedures. Documentation of the instruction for employees and students shall be copied and forwarded to the Risk & Safety Office following the education and training on the appropriate form.

10.2 Respiratory Protection (Fit Testing Procedure)

A fit test must be performed by respirator users before use in everyday work or emergency situations. The inhalation and exhalation test can be done before attaching the cartridges to the face piece. Place the wide part of the face piece over the chin, then place the narrow portion over the nose. Put the straps over the back of the head and around the neck, then tighten.

10.2.1 Inhalation Test:

Cover the inhalation valves (where cartridges are attached) with the palm of your hands and breathe in normally. The face piece should collapse against the face. If leakage is noticed around the mask, it does not fit properly. Adjust the straps and repeat. Once leakage no longer occurs, go on to the exhalation test.

10.2.2 Exhalation Test:

Cover the exhalation valve (centre front) with the palm of your hand and exhale normally. Note if any leakage occurs adjust until leakage does not occur.

10.2.3 Qualitative Fit Test:

University personnel who use respirators require a qualitative fit test when a respirator is issued. The qualitative fit test shall be repeated on an annual basis.

Attach black or yellow cartridges to respirator. A sample of banana oil (amyl acetate - a drop or two on a tissue) is waved around the user's face while moving head sideways, up and down and while loudly counting to ten. If the odour can be detected, leakage is occurring and further adjustments must be done.

If leakage occurs or the respirator fits uncomfortably tight, a different size mask or different brand may be required. If a good fit cannot be obtained, do not use. Report the problem to your supervisor immediately in order that it may be remedied. Employees, students or employees of contractors required to use a respirator shall be clean shaven where the respirator seals with the face.

10.3 Respiratory Protection - Access Route Signs

Access routes to work areas where employees, students, or employees of contractors may be exposed to oxygen deficient atmospheres or harmful concentrations of air contaminants shall be posted with signs specifying:

- a) the required personal protective equipment, and
- b) the areas and hazards involved.

10.4 Respiratory Protection (Availability and Training of Rescue Workers)

The University shall endeavour to train sufficient employees in rescue procedures so that they may be available whenever workers are working in areas where an oxygen deficient atmosphere or harmful concentrations of air contaminants exists or is likely to develop. The rescue workers shall have immediate access to appropriate breathing apparatus or other aids necessary to effect a rescue.

10.5 Respiratory Protection (Respirable Air Supply)

Supervisors shall ensure that respirable air supplied by mechanical ventilation devices is free of dust, oil vapours, toxic or noxious fumes or gases.

10.6 Respiratory Protection (Compressed Air Purity)

Compressed air used for breathing purposes in self-contained breathing apparatus operated by the University or its contractors shall meet the requirements of the Canadian Standards Association Standard Z180.1, "Purity of Compressed Air for Breathing Purposes", as amended from time to time, or other standards acceptable to the Workers' Compensation Board.

10.7 Respiratory Protection (Audible Alarms)

Self-contained breathing apparatus utilized by the University or its contractors shall be equipped with an audible alarm which will provide warning when air or oxygen supply has diminished to 20% of the capacity of the unit or to a 5 minute reserve capacity, whichever is greater. The only exception is breathing apparatus, using compressed air, intended for self rescue or escape purposes although it shall have an easily read indication of its suitability for use.

11. Hearing Protection

All employees, students, approved visitors or employees of contractors exposed to excessive noise levels while working shall be supplied with and wear a hearing protection device in accordance with the following table:

Hearing Protection Devices

Steady State Noise for 8 Hours (dBA)	Minimum CSA Class of Hearing Protector (CSA Standard Z94.2-1974)
85 - 95	C
96 - 105	B
106 - 115	A
over 115	A muff and B plug
Impact Noise	A

Hearing protection meeting the prescribed standard shall be supplied to approved visitors when visiting a work area where the visitor would otherwise be exposed to the same hazard as an employee or worker.

12. Safety-Belts (General Requirements)

Where it is impracticable to provide adequate work platforms, scaffolds or staging; safety belts and life lines or safety straps shall be worn by all employees or employees of contractors working elevations 10 feet (3m) or more above grade or floor level.

The only exception to this are contracted structural steel erectors or similar tradesmen experienced in working at heights in circumstances where:

- a) the use of belts, life lines or safety straps would produce an additional hazard or is clearly impracticable, or
- b) safety nets or equivalent protection against falling are in use.

12.1 Life Line and Life Line Attendant

When an employee or employee of a contractor is working under circumstances where he might become entrapped by material, or be overcome by any other cause, he/she shall wear a safety belt or safety harness attached to a life line or other device, attended by another person who shall be stationed, equipped and capable of immediately effecting a rescue.

12.2 Harness (Lifting Through Manholes)

Where an employee or employee of a contractor must be lifted through a manhole or other opening of such size as to necessitate lifting him in a vertical altitude, the employee or an employee of a contractor shall wear a harness which will permit lifting him in such a manner. A wrist harness alone is not acceptable for this purpose.

12.3 Safety Belt Standards

Safety belts, lanyards and connecting parts used by the University or its contractors shall be in conformity with Canadian Standards Association Standards Z259.1 (Fall Arresting Safety Belts and Lanyards for the Construction and Mining Industry), as amended from time to time, or such other standards, appropriate to the types of belts involved, as are acceptable to the Workers' Compensation Board.

12.4 Securing and Protecting Life Lines and Safety Straps

Life lines and safety straps shall be independently secured to firm structures having adequate strength for the purpose. Life lines shall be suitably padded at points of attachment and elsewhere, as necessary, to protect against chafing or abrasion caused by contact with sharp edges. Permanent anchors for window cleaners' safety straps shall conform to the requirements of the Canadian Standards Association Standard Z91 (Code of Practice for Window Cleaning), as amended from time to time.

12.5 Life Lines, Lanyards and Safety Straps

Life lines, lanyards and safety straps utilized by the University or its contractors shall be:

- a) first grade, three strand, hawser-laid manila rope of not less than 3/4 inch (19 mm) diameter, having a breaking strength of not less than 5 400 pounds (24 kN), or
- b) synthetic fibre rope or webbing or wire rope having a breaking strength not less than that specified above.

12.6 Life Lines, Lanyards and Safety Straps (Protection Against Abrasion)

When axes or other tools are used which are likely to sever, abrade or burn the life line, lanyard or safety strap, wire rope of equivalent strength, or 4 strand, wire-cored manila rope of not less than

5/8 inch (16 mm) diameter and having a breaking point of not less than 5 250 lbs. (23.4 kN), shall be used.

The only exception to the above shall be where employees or employees of contractors are engaged in work in proximity to energized electrical circuits or in other work where conductive straps cannot be used. In this case, two non-conductive safety straps shall be worn to provide the additional protection required, in lieu of the wire or wire-cored rope specified.

12.7 Life Lines, Lanyards and Safety Straps (Rope Continuity and Length)

Life lines, lanyards and safety straps shall be free of knots or splices except at their terminals. Life lines shall extend to within 10 feet (3 m) of ground level or a safe landing.

Life lines exceeding 300 feet (91 m) in length shall not be used without the prior permission of the Workers' Compensation Board.

12.8 Life Lines, Lanyards and Safety Straps (Splices)

Terminal eye splices in hawser-laid manila ropes shall have a minimum of 4 tucks. Eye splices in synthetic fibre ropes shall have a minimum of 6 tucks. Splices in braided ropes shall be made in conformity with the manufacturer's instructions.

12.9 Life Lines, Lanyards and Safety Straps (Window Cleaner's Safety Straps)

A window cleaner's safety strap or rope shall be so attached to the safety belt that it cannot pass through the belt fittings, should either end become loose from its anchorage.

12.10 Life Lines, Lanyards and Safety Straps (Thimbles)

Thimbles shall be installed to protect ropes from chafing at points of connection to eyes, rings and snaps.

12.11 Life Lines, Lanyards and Safety Straps (Free Fall Limits)

Safety belts, safety straps and life lines shall be arranged to limit the free fall of an employee or employee of a contractor to 4 feet (1.22m).

12.12 Life Lines, Lanyards and Safety Straps (Number of Workers on Each Life Line)

Not more than one employee or employee of a contractor shall be attached to any one life line.

12.13 Life Lines, Lanyards and Safety Straps (Maintenance of Equipment)

Belts, straps, harnesses, life lines and other similar devices shall be kept free from substances and conditions which could contribute to deterioration. Such equipment shall be carefully inspected before use. If any impairment of function is detected the defective part shall be removed for service.

12.14 Life Line and Safety Belt Accessories

Accessories to life lines and safety belts including rope grabs, shock limiting devices and other attachments, shall be of types acceptable to the Workers' Compensation Board.

13. Personal Protective Equipment (General Maintenance)

All personal protective equipment shall be maintained in good working order and in a sanitary condition.

14. Responsibility for Personal Protective Equipment

14.1 Risk & Safety Office is responsible for:

- providing advice or recommendation regarding the selection or procurement of personal protective equipment in accordance with the Industrial Health and Safety Regulations, or where no regulations exist, in accordance with consensus standards or other standards of safety or performance;
- providing advice or recommendation regarding the selection or procurement of signage identifying personal protective equipment to be worn in hazardous areas;
- coordinating education and training programs in the use and maintenance of personal protective equipment and in rescue operations where an oxygen deficient atmosphere or harmful concentration of air contaminants is likely to develop;
- conducting inspections and audits regarding the use and maintenance of personal protective equipment on campus;
- maintaining records of education and training in the use and maintenance of personal protective equipment, respirator fit testing, inspection reports and audits concerning personal protective equipment.

14.2 Purchasing Office is responsible for:

- ensuring that personal protective equipment procured by the University meets the appropriate standards specified;
- ensuring that purchase requisitions or other requests for personal protective equipment have been reviewed and approved by the requisitioner's supervisor in consultation with the Risk & Safety personnel;
- ensuring that purchase requisitions or other requests for signage identifying personal protective equipment to be worn in hazardous areas has been approved by the requisitioner's supervisor in consultation with the Facilities Department and the Risk & Safety Office.

14.3 Supervisors and Instructors are responsible for:

- utilizing personal protective equipment which is a requirement of University procedure or provincial regulation;
- setting a good example for employees or students under their direction or supervision;
- enforcing University procedures regarding the use and maintenance of personal protective equipment for employees or students under their direction or supervision;
- identifying and specifying the personal protective equipment which must be used by employees or students under their direction or supervision during the course of their work or studies;
- procuring and specifying personal protective equipment which meets the requirements of University procedure or provincial regulatory requirements;
- procuring and posting signage in consultation with Facilities and the UNBC Risk & Safety Office to alert employees, students, visitors or employees of contractors of the requirement for personal protective equipment in hazardous areas;
- ensuring employees or students under their direction or supervision are adequately trained in the use and maintenance of personal protective equipment which is required for their work or studies; and
- ensuring that worn, consumed or otherwise deficient personal protective equipment is repaired, replaced, or acquired in a timely manner if the equipment is required.

14.4 Employees and Employees of Contractors are responsible for:

- utilizing and maintaining personal protective equipment which they have been advised to wear or which is a requirement of University procedure or provincial regulation;
- assisting supervisors in identifying the appropriate personal protective equipment to be used; and
- immediately reporting deficiencies or malfunctions of personal protective equipment to their supervisor.

14.5 Students and Approved Visitors are responsible for:

- utilizing personal protective equipment which they have been advised to wear or which is a requirement of University procedure or provincial regulation; and
- immediately reporting deficiencies or malfunctions of personal protective equipment provided for their use to their instructor or the employee or contractor supervising their visit.