DEFINITION AND APPLICATION

30.1 Definition
30.1.1 Application

GENERAL REQUIREMENTS

30.2 Equipment operation
30.3 Electrical services [Repealed]
30.4 Plumbing
30.5 Fire protection
30.6 Guarding
30.7 Equipment ventilation
30.7.1 Definitions
30.8 Laboratory fume hoods
30.9 Airflow and containment monitoring
30.10 Ducting
30.11 Exhaust discharge
30.12 Biological safety cabinets
30.13 Centrifuges
30.14 Procedures
30.15 Permitted quantities
30.16 Transport of containers
30.17 Personal protection
30.18 Spills and other emergencies
30.19 Waste disposal

SPECIFIC SUBSTANCES AND PROCEDURES

30.20 Explosive and highly reactive materials
30.21 Perchloric acid
30.22 Picric acid
30.23 Peroxide-forming compounds
30.24 Cryogenic liquids
30.25 Sharps
30.26 Biological agents and human pathogens
30.27 Animal handling
30.28 Microtomes
30.29 Electrophoresis

30.1 Definition

In this Part, *"biological agent"* means a biological agent designated as a hazardous substance under section 5.1.1.

[Enacted by B.C. Reg. 312/2010, effective February 1, 2011.]

30.1.1 Application

This Part applies to rooms, buildings or areas in buildings equipped with apparatus, equipment,chemicals or test animals and used for research, quality control, performance of tests, experiments or measurements, photographic development, or the preparation of drugs or other products in the natural sciences.

[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.2 Equipment operation

Operators of laboratory equipment must be adequately instructed and trained in the safe use of laboratory equipment and the precautions to be taken when the equipment is used.

[Enacted by B.C. Reg. 312/2003, effective October 29, 2003.]

30.3 Electrical services

Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.]

30.4 Plumbing

(1) Laboratory water faucets with goosenecks must be protected by vacuum breaks meeting the requirements of *ANSI Standard ANSI/ASSE 1001-1990, Pipe Applied Atmospheric Type Vacuum Breakers*.

(2) Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.]

(3) The location of an in-line vacuum break must be clearly identified.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]

30.5 Fire Protection

(1) Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.]

(2) Suitable fire extinguishers of a size easily handled by laboratory workers must be immediately accessible wherever flammable materials are used or stored.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]

30.6 Guarding

(1) Laboratory equipment which presents a physical hazard to workers must be adequately guarded, shielded or isolated by location.

(2) Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.]

(3) Hazards of equipment use must be identified on the equipment.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]

30.7 Equipment ventilation

Laboratory equipment and instruments which may emit harmful quantities of a substance during their operation must be provided with an effective local exhaust ventilation system.

30.7.1 Definitions

In sections 30.8 to 30.11:

"laboratory fume hood" means an enclosed and mechanically ventilated workspace located in a laboratory, that is designed to

(a) draw air into the workspace and to prevent or minimize the escape of airborne contaminants out of the workspace, and

(b) allow a worker to conduct physical, chemical and biological manipulations inside the workspace;

"operational face opening" means an opening in a laboratory fume hood through which a worker may conduct work inside the hood;

"sash" means a vertical or horizontal panel on a laboratory fume hood that defines the operational face opening and provides a protective barrierbetween the worker conducting work inside the hood and the contents of the hood.

[Enacted by B.C. Reg. 319/2007, effective February 1, 2008.]

30.8 Laboratory fume hoods

(1) A laboratory fume hood and its related ductwork must be designed, installed and maintained in accordance with the *Industrial Ventilation, A Manual of Recommended Practice*, published by the American Conference of Governmental Industrial Hygienists, as amended from time to time.

(2) A laboratory fume hood must

(a) be connected to a local exhaust ventilation system,

(b) provide average face velocities of 0.4 m/s (80 fpm) to 0.6 m/s (120 fpm) across the operational face opening,

(c) not have face velocities of less than 80% of the average face velocity required in paragraph (b) at any point across its operational face opening, and

(d) not have face velocities of more than 120% of the average face velocity required in paragraph (b) at any point across its operational face opening.

(2.1) A laboratory fume hood must have a sash that is positioned to protect the upper body and face of a worker working in the laboratory fume hood from accidental releases of the contents of the hood while allowing hand and arm access to equipment inside the hood.

(2.2) A laboratory fume hood with a movable sash must be clearly marked to identify the maximum size of the operational face opening that will maintain the average face velocities required in subsection (2)(b).

(2.3) The employer must ensure

(a) that before it is used, a commercially manufactured laboratory fume hood has been certified as being tested by the manufacturer, and

(b) following installation and before it is used, a custom built laboratory fume hood is tested on site by a qualified person.

(2.4) A laboratory fume hood tested under subsection (2.3) must demonstrate containment not greater than the control level of 0.05 ppm when tested under "as manufactured " test conditions in accordance with the methods described in *ANSI/ASHRAE Standard 110-1995, Method of Testing Performance of Laboratory Fume Hoods*.

(2.5) The installation of a laboratory fume hood must be certified by a professional engineer.

(3) A laboratory fume hood must be located to prevent cross drafts or other disruptive forces from lowering the air flow across the operational face opening to unacceptable levels.

(4) A laboratory fume hood and its ductwork must be constructed from materials compatible with its use.

(5) A laboratory fume hood that will be or is being used for working with

(a) radioactive material in amounts that exceed the exemption quantity specified by the Canadian Nuclear Safety Commission, or

(b) perchloric acid

must be clearly labelled with applicable restrictions on its use.

(6) A laboratory fume hood must not be used for storage of chemicals unless it is used exclusively for this purpose and is labelled with this limitation.

(7) Controls for the operation of a laboratory fume hood and its service fixtures must be

(a) located on the outside of the laboratory fume hood, and

(b) immediately accessible to the worker conducting work in the laboratory fume hood.

(8) Despite subsection (7), water taps may be located inside a laboratory fume hood if the main shutoff valve for the water is located outside the laboratory fume hood.

(9) Equipment being used in a laboratory fume hood must

(a) be kept at least 15 cm (6 in.) from the operational face opening of the laboratory fume hood, and

(b) not adversely affect airflow into the laboratory fume hood.

(10) Written procedures must be developed and implemented to ensure safe use and operation of a laboratory fume hood.

[Amended by B.C. Reg. 315/2003, effective October 29, 2003.]
[Amended by B.C. Reg. 319/2007, effective February 1, 2008.]

30.9 Airflow and containment monitoring

(1) Face velocities over the operational face opening of a laboratory fume hood must be quantitatively measured and recorded.

(2) The ability of a laboratory fume hood to

(a) maintain an inward flow of air across the operational face opening, and

(b) contain contaminants

must be assessed and recorded using a smoke tube or other suitable qualitative method.

(3) The actions described in subsections (1) and (2) must be performed

(a) after the laboratory fume hood is installed and before it is used,

(b) at least once in each 12 month period after installation, and

(c) after any repair or maintenance that could affect the air flow of the hood.

(4) If a laboratory fume hood is found to be operating with an average face velocity of less than 90% of the average face velocity required in section 30.8 (2), the employer must immediately take corrective action to bring the average face velocity within the required range of velocities.

(5) Airflow in a laboratory fume hood must be monitored continuously if loss of airflow will result in risk to a worker.

(6) A laboratory fume hood that is being installed must have an alarm capable of indicating when the average face velocity falls below the minimum average face velocity level required in section 30.8 (2) when the hood is in use.

[Enacted by B.C. Reg. 319/2007, effective February 1, 2008.]

30.10 Ducting

(1) Laboratory fume hoods located in the same room or separate rooms may be connected to a common exhaust duct or manifold system if the following conditions are satisfied:

(a) the requirements of section 5.3.2 of *ANSI/AIHA Standard Z9.5-2003, Laboratory Ventilation* are met;

(b) controls to prevent backdrafts and pressure imbalances between rooms are installed;

(c) the ventilation design and installation of the common exhaust duct or manifold system is certified by a professional engineer.

(2) Despite subsection (1), laboratory fume hoods that are or will be used for working with

(a) radioactive materials in amounts that exceed the exemption quantity specified by the Canadian Nuclear Safety Commission, or

(b) perchloric acid

must not be connected to a manifold system.

(3) Ducting used in the installation of a laboratory fume hood must be designed in accordance with established engineering principles.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]
[Amended by B.C. Reg. 319/2007, effective February 1, 2008.]

Note: *Industrial Ventilation — A Manual of Recommended Practice,* published by the ACGIH is an acceptable source of established engineering principles.

30.11 Exhaust discharge

Laboratory fume hood local exhaust ventilation systems must discharge to the atmosphere in such a manner that the discharged air will not be recirculated into the laboratory or other work areas.

[Amended by B.C. Reg. 319/2007, effective February 1, 2008.]

30.12 Biological safety cabinets

(1) The limitations of a biological safety cabinet must be clearly posted on the unit and followed by workers.

(2) Biological safety cabinets must be certified by a qualified person at least annually and before use after

(a) initial installation,

(b) change of the HEPA (high efficiency particulate air) filter,

(c) moving of the unit, and

(d) any repair or maintenance that could affect the seal of the HEPA filter.

(3) Certification procedures used for compliance with subsection (2) must meet the requirements of the *National Sanitation Foundation (NSF) Standard 49-2002, Class II (Laminar Flow) Biohazard Cabinetry*, and a record of the results must be maintained.

(4) Recirculation of exhaust air into a workspace from a biological safety cabinet is not permitted where volatile toxic materials or flammable liquids or gases are used in the cabinet, or where volatile radioactive materials are used in amounts that exceed the exemption quantity specified by the Canadian Nuclear Safety Commission.

(5) Repealed. [B.C. Reg. 319/2007, effective February 1, 2008.]

(6) Biological safety cabinets used for handling a biological agent must be operated and ventilated in accordance with the *Laboratory Biosafety*

Guidelines 3rd edition, 2004, issued by the Public Health Agency of Canada.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]
[Amended by B.C. Reg. 319/2007, effective February 1, 2008.]
[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.13 Centrifuges

(1) Centrifuge loads must be balanced by sample distribution.

(2) Aerosol-proof safety heads or cups or other equally effective means to prevent exposure of workers must be used where an aerosol containing a biological agent may be generated, where carcinogens are present or where radioactive samples pose a hazard to workers.

(3) Unless exempted by *CSA Standard C22.2 No. 151-M1986 Laboratory Equipment*, or other standard acceptable to the Board, centrifuge doors must be interlocked to prevent workers accessing spinning rotors.

(4) The interlock required by subsection (3) must prevent the door from opening while the rotor is spinning or cause the rotor to brake if the door is opened, or another equally effective means must be used to prevent a worker from accessing the spinning rotor.

(5) Equipment purchased before April 15, 1998 is exempt from the application of subsection (3) until January 1, 2001.

(6) Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.]

(7) Rotors must be stored in a manner which will prevent them from being damaged.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]
[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.14 Procedures

Written safe work procedures must be prepared for hazardous operations, including work methods involving hazardous chemicals, spill response, and handling of a material that contains a biological agent, and workers must be adequately instructed in and follow the procedures.

[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.15 Permitted quantities

Only the minimum necessary amount of biological agents and substances that are combustible, flammable, corrosive, toxic or highly reactive may be kept in the working area of the laboratory.

[Enacted by B.C. Reg. 312/2010, effective February 1, 2011.]

30.16 Transport of containers

The transport of containers of flammable, corrosive, toxic or highly reactive substances or biological agents through a laboratory must be done in a manner that will not pose a danger of damage to the containers.

[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.17 Personal protection

(1) A worker must wear protective laboratory clothing in a laboratory where a toxic or radioactive substance or a biological agent is handled.

(1.1) Protective laboratory clothing worn in circumstances referred to in subsection (1) must not

(a) be worn outside an area where a worker is required to wear the protective work clothing, and

(b) be stored in a manner or location that might expose a worker to a hazardous substance

(2) Smoking, eating or drinking is not permitted in any laboratory area.

(3) Food for consumption must not be kept in the laboratory, and laboratory glassware, vessels and containers must not be used to prepare or store food or beverages for consumption.

(4) Substances must not be pipetted by mouth.

(5) If hazardous chemicals or materials are handled, all affected workers must receive instruction and training in the proper handling and disposal of such materials.

[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.18 Spills and other emergencies

(1) Accidental release or spills of chemicals or other hazardous substances must be controlled immediately, and cleaned up under the supervision of persons knowledgeable in the hazards involved and the precautions to be taken during the cleanup operations.

(2) Personal protective equipment required during emergency cleanup or escape must be kept immediately available.

30.19 Waste disposal

(1) Laboratory waste must be disposed of in a manner which ensures that workers are protected from injury.

(2) Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.]

(3) Before disposal, organic solvents and flammable wastes must be collected in separate, tightly covered containers or in an equally effective manner.

(4) Before disposal, water solutions containing azides must first be inactivated, and contact with heavy metals or other incompatible contaminants must be prevented.

(5) Waste material that contains a biological agent must be collected in separate, tightly covered containers before disposal.

(6) Containers of segregated waste must be clearly identified as to their intended use.

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]
[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.20 Explosive and highly reactive materials

(1) Quantities of explosive and highly reactive material available at the workbench or in the work area must be restricted to amounts immediately required for the work day.

(2) Storage facilities for explosive and highly reactive materials must be located and designed so as to prevent risk to workers.

(3) Explosive and highly reactive materials must be stored in a manner free from shock, vibration or other conditions which may compromise the stability of the material.

(4) If due to the nature of the laboratory work, explosions or implosions may result, the laboratory apparatus or equipment involved in such work must be adequately shielded and the operators must be provided with and must wear suitable personal protective devices, and wherever practicable the work must be safely isolated from workers by distance.

30.21 Perchloric acid

(1) Perchloric acid must be used in a fume hood designed exclusively for its use and posted with a notice which

(a) identifies the hood as being for perchloric acid use, and

(b) prohibits the use or storage of combustibles in the hood.

(2) Exhaust ducts must be as short as possible, routed directly outdoors with no interconnections to other exhaust ducts, and provided with washdown facilities.

(3) No more than 6.4 kg (14 lbs) of perchloric acid may be stored in a laboratory unless the laboratory facility consists of several smaller laboratories physically separated as fire compartments meeting the requirements of the *BC Fire Code,* in which case a maximum of 6.4 kg (14 lbs) of perchloric acid may be stored in each laboratory.

(4) Containers of perchloric acid must be stored in such a manner that, in the event of breakage, the spilled acid will not contact flammable materials, wood or similar combustible materials.

(5) Stored perchloric acid must be inspected at least monthly and if any discolouration is noted it must be disposed of immediately and in a safe manner.

(6) Anhydrous perchloric acid may only be used if freshly made, and any unused perchloric acid must be disposed of safely at the end of the experiment or procedure but must not be kept for more than one day.

(7) Direct flames, oil baths and electrical stirring equipment must not be used to heat perchloric acid.

(8) Rubber stoppers or equipment with rubber components must not be used with perchloric acid.

(9) Spilled perchloric acid must immediately be neutralized and cleaned up using safe procedures, and waste material from the cleanup must be kept moist, sealed in plastic bags, placed in a separate covered metal waste receptacle and disposed of as soon as possible.

30.22 Picric acid

(1) Solid picric acid must be stored with at least 10% moisture content and regular inspections must be made to ensure that the minimum moisture content is maintained.

(2) Solutions of picric acid must not be allowed to accumulate and dry around cap threads.

(3) Materials suspected of being in an unacceptable condition must be safely handled and disposed of by workers instructed in the applicable hazards, precautions and safe disposal methods.

30.23 Peroxide-forming compounds

(1) Peroxide-forming compounds must be inspected and tested for peroxides regularly after the container is first opened, and records of the tests must be maintained.

(2) Compounds contaminated with peroxide materials must be disposed of using safe work procedures or must be treated chemically to eliminate the peroxides.

Note: Examples of substances that can form explosive conditions upon peroxide formation are provided in the *Laboratory Health and Safety Handbook* published by the Board.

30.24 Cryogenic liquids

(1) Containers used for storage, transport and dispensing of cryogenic liquids must be designed for that purpose.

(2) Indoor dispensing stations and storage locations for cryogenic liquids must be adequately ventilated and monitored to prevent the development of harmful atmospheres.

(3) Dispensing stations and freezers with automatic filling cycles for cryogenic liquids must be posted with a sign identifying the materials, the hazards and the precautions required.

30.25 Sharps

(1) Safe means of handling needles and other sharp materials must be provided and used.

(2) Recapping of needles before disposal is not permitted unless the recapping device is specifically designed for single handed use, or is otherwise safe for use.

30.26 Biological agents and human pathogens

(1) Adequate facilities must be readily available for personal decontamination of workers who come in contact with a biological agent.

(2) Work procedures which may generate aerosols containing a biological agent must be performed only under controlled conditions designed to minimize creation of the aerosols and prevent worker exposure to them.

(3) For Risk Group 2 human pathogens, sealed centrifuge safety heads, rotors or trunnion cups must be opened within a fume hood or biological safety cabinet unless there is a means of visually determining, by use of clear safety caps or other effective means, that no breakage or leaking has occurred.

(4) For Risk Group 3 human pathogens, sealed centrifuge safety heads, rotors or trunnion cups must be loaded and unloaded within a biological safety cabinet.

(5) Work involving Risk Group 4 human pathogens must be done as required by the *Laboratory Biosafety Guidelines 3rd edition, 2004*, issued by the Public Health Agency of Canada.

(6) In this section:

"Risk Group 2 human pathogens" mean the human pathogens that are classified by the Public Health Agency of Canada as Risk Group 2 human pathogens;

"Risk Group 3 human pathogens" mean the human pathogens that are classified by the Public Health Agency of Canada as Risk Group 3 human pathogens;

"Risk Group 4 human pathogens" mean the human pathogens that are classified by the Public Health Agency of Canada as Risk Group 4 human pathogens

[Amended by B.C. Reg. 312/2003, effective October 29, 2003.]
[Amended by B.C. Reg. 312/2010, effective February 1, 2011.]

30.27 Animal handling

(1) Animal quarters and handling areas must be maintained in a clean, hygienic state.

(2) Work procedures and handling methods must be designed to control the spread of aerosols.

(3) Animal health must be monitored by qualified personnel and quarantine measures must be taken as required for infected animals.

(4) Appropriate handling and restraint equipment must be available to workers, and workers must use this equipment, as required, to prevent injury due to bites or other accidents.

(5) Workers must be instructed and trained in effective animal handling techniques.

30.28 Microtomes

Microtome blades must be stored in a safe manner with the blade edge guarded.

30.29 Electrophoresis

(1) Electrophoresis apparatus must be designed and maintained so that any hazardous electrical current is shut off when the cover is opened.

(2) Equipment must display a label warning workers of the electrical hazard, and all high voltage components must be guarded to prevent worker contact.

Back to Top