McMaster University

# Risk Management Manual Program

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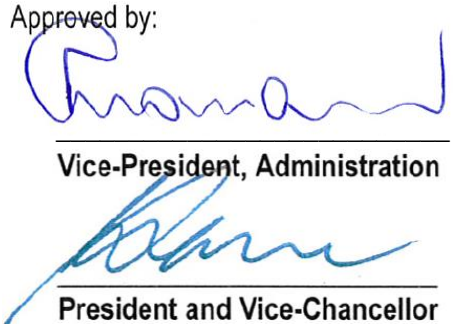
| Complete Program Title:<br>**Personal Protective Equipment Program** | Risk Management Manual (RMM) Number:<br>**320** |
| Approved by:<br>  <br>Vice-President, Administration<br><br>President and Vice-Chancellor | Date of Most Recent Approval:<br>**July 2015** |
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| Responsible Executive:<br>**Vice-President, Administration** | Enquiries:<br>**Environmental and Occupational Health Support Services (EOHSS) eohss@mcmaster.ca** |
| ***DISCLAIMER:*** *If there is a discrepancy between this electronic program and the written copy held by the program owner, the written copy prevails.* | |

## 1 PURPOSE

1.1 To protect the health and safety of faculty, staff, students, visitors and volunteers by ensuring they are protected through use of personal protective equipment (PPE). To ensure compliance with the Occupational Health and Safety Act (OHSA), R.S.O. 1990, Section 25 (1) , Reg. 833 / 90 Control of Exposure to Biological or Chemical Agents, Section 3, 7 and Schedule (1).

## 2 SCOPE

2.1 All faculty, staff, students, visitors, and volunteers performing tasks or entering areas that require specific Personal Protective Equipment (PPE).

## 3 Related Documents

3.1 Ontario Occupational Health and Safety Act R.S.O. 1990

3.2 RMM# 100 McMaster University Workplace & Environmental Health and Safety Policy

3.3 McMaster University RMM #310 Eye Protection Program

3.4 McMaster University RMM #311 Respirator Protection Program

3.5 McMaster University RMM #312 Foot Protection Program

3.6 McMaster University RMM #313Head Protection Program

3.7 McMaster University RMM #321 Hand Protection Program

3.8 Laboratory Safety Handbook by the Chemical Institute of Canada

3.9 McMaster University RMM#309 McMaster Laboratory Safety Handbook

3.10 McMaster University RMM #306 Lockout/Tagout Program

3.11 McMaster University RMM #324 Job Hazard Analysis Program

3.12 McMaster University RMM #111 Contracting Work Safety Program / Due Diligence Program

## 4 DEFINITIONS

4.1 **Eye/Face Protection** – equipment designed to provide protection to the face and eyes during exposure to hazardous objects, sparks, liquid chemicals, acids, caustic substances or potentially injurious light (i.e. lasers, welding arc etc.).

4.2 **Protective clothing** - equipment such as lab coat and/or apron, which must be worn when handling hazardous material or as prescribed in the MSDS.

4.3 **Foot Protection** – equipment designed to provide protection to the feet and toes during exposure to situations with the potential for injuries such as: falling or rolling objects, chemical or liquid exposures, piercing objects through the sole or uppers and/or where employee's feet are exposed to electrical hazards.

4.4 **Hand Protection** – equipment designed to provide protection to the hands during exposure to potential hazards such as: sharps, abrasive surfaces, temperature extremes and chemicals. Hand protection is selected based upon the hazard and performance characteristics of the glove.

4.5 **Hazard Assessment -** the process utilized to identify hazards in the workplace and to select the appropriate Personal Protective Equipment to protect persons against potential hazards.

4.6 **Head Protection -** headwear designed to provide protection to the head from hazards such as: falling objects, falling from a height, striking against low hanging objects or electrical hazards.

4.7 **Hearing Protection** - noise dampening devices that are worn to reduce the harmful auditory and/or annoying effects of sound. A last resort when other means are not available.

4.8 **Personal Protective Equipment (PPE)** – personal apparel designed to provide protection to the wearer in areas such as eyes, face, hands, head, feet, ears and extremities from potential hazards.

4.9 **Respiratory Protection Equipment** – personal safety devices designed to provide protection to the wearer from potential inhalation hazards such as vapor, mist, particulates, and gases.

4.10 **Supervisor** – a person who has charge of a workplace or authority over a worker. A supervisor is also a worker.

**Worker** – means any of the following, but does not include an inmate of a correctional institution or like institution or facility who participates inside the institution or facility in a work project or rehabilitation program:

1. A person who performs work or supplies services for monetary compensation.
2. A secondary school student who performs work or supplies services for no monetary compensation under a work experience program authorized by the school board that operates the school in which the student is enrolled.
3. A person who performs work or supplies services for no monetary compensation under a program approved by a college of applied arts and technology, university or other post-secondary institution.
4. A person who received training from an employer, but who, under the Employment Standards Act, 2000, is not an employee for the purposes of that Act because the conditions set out in subsection 1(2) of that Act have been met.
5. Such other persons as may be prescribed who perform work or supply services to an employer for no monetary compensation; (“travailleur”).

4.11 **Acronyms:**

**EOHSS** – Environmental and Occupational Health Support Services

**FHS Safety Office** – Faculty of Health Science Safety Office

**PPE**- Personal Protective Equipment

**MSDS** – Material Safety Data Sheet

**OHSA** – Occupational Health and Safety Act

**JHA** – Job Hazard Analysis

**RMSG** – Risk Management Support Group

**PI** – Principal Investigator

## 5 RESPONSIBILITIES

### 5.1 Role of Senior Management: (PVP, Deans, Vice President Administration)

Senior Managers shall:

- provide the direction and resources necessary to support the PPE Program; and
- ensure that the staff under their direction are aware of and abide by this program.

## 5.2 Role of Supervisors (Academic and Administrative):

Supervisors shall:

- complete a JHA for the activities in his/her area to identify potential hazards and methods to eliminate risk, if possible. Hazard assessments will be conducted initially, when work practices change, at a minimum, they will be reviewed annually, and maintained in the department;
- ensure preventative and protective measures shall be implemented according to the following priority:
    - eliminate the hazard;
    - substitute if possible;
    - use engineering controls to minimize hazard;
    - use a safer work method/procedure that includes awareness of potential hazards;
    - provide administrative controls such as training and procedures; and
    - provide PPE and include measures to ensure its appropriate use and maintenance.
- determine, based on the JHA and MSDS, the correct PPE necessary to perform the activities in a safe manner;
- be responsible for ensuring that workers wear the required PPE;
- supply or ensure that appropriate PPE is available for all who must be so equipped;
- post designated PPE areas;
- document all PPE training; and
- train workers under their supervision regarding:
    - when PPE is necessary;
    - what type to use;
    - how to put on, take off, adjust and wear appropriate PPE;
    - proper maintenance, storage, disposal and shelf life of PPE; and
    - Supervisors will ensure that anyone entering their work space will wear appropriate PPE (i.e. Visitors as noted in section 1.1 or Contractors in section 5.6).

5.3 **Role of Individuals (Faculty, Staff, Students, and Volunteers):**

Individuals shall:

- participate in any required training in the use and care of PPE;
- wear the PPE prescribed by the supervisor as being appropriate for the involved task;
- follow the prescribed guidelines for the use and care of approved PPE;
- wear PPE as described by posted notices.
- communicate to his/her supervisor any unforeseen hazards requiring additional PPE; and
- report to his/her supervisor any defective PPE or need for replacement.

5.4 **Role of EOHSS and FHS Safety Office:**

These offices shall:

- provide advice to supervisors regarding the type of PPE required; and
- update the PPE Program as required.

5.5 **Role of Risk Management Support Group (RMSG):**

The RMSG shall:

- provide advice and direction on the need for and type of PPE required in the workplace; and
- review and make comment on all proposed changes to the PPE Program.

5.6 **Role of Contractors:**

Contractors shall:

- work in compliance with the Act and McMaster University Risk Management Manual and with particular attention to:
    - contracting Work Safety Program/Due Diligence Program, RMM#111;
- wear PPE as prescribed by McMaster posted PPE area notices; and
- post designated construction sites as PPE areas.

5.7 **Role of Joint Health and Safety Committees:**

JHSC's shall:

- review the effectiveness of the PPE Program in posted areas and within assigned work groups as part of the workplace inspection process.

5.8 **Role of Central Joint Health and Safety Committee:**

The CJHSC shall:

- review the PPE Program on a scheduled basis.

## 6 HAZARD ASSESSMENT

6.1 The hazard assessment is a formal process that is done prior to the selection of personal protective equipment, based on the hazards of the job. Hazard assessments are required prior to working with new equipment, processes, and materials. When conducting a hazard assessment, a task is investigated and the hazards and the potential hazards associated with the task are determined. This allows selection of personal protective equipment that will protect the worker from the identified hazards, if there is no other means of protecting the worker(s).

6.2 A hazard assessment may be conducted for a single worker, or a single task, or a group of employees if all employees perform the identical task. For example, if all employees in a group are exposed to corrosive liquids during one task, potential hazards are skin and eye damage. The recommended PPE are splash goggles, gloves, which are chemical resistant for the compound, lab coat and/or apron, closed toed shoes. The hazard assessment would include all workers conducting that task and may include any other group that uses similar types of materials.

6.3 During the hazard assessment of each task, inspect the layout of the workplace and look for the following hazard sources:

- High or low temperature that may result in: burns, eye injury, ignition of equipment, heat/cold stress, frostbite, lack of co-ordination, etc.;
- Chemical exposure, including airborne or skin contact that may injure due to contact or inhalation;
- Biological hazards e.g. bacteria, animals etc.;
- Harmful dust or particulates
- Radiation e.g. welding, arc lamps, heat treating, lasers, growth lights, x-rays, radioisotopes etc.;
- Sources of falling objects, potential for dropping objects, or rolling objects that could crush or pinch the feet;

- Sharp objects that may pierce the feet or cut the hands;
- Observe the layout of the workplace and the location of co-workers for potential collisions with other personnel or objects;
- Electrical hazards; and
- Any other identified potential hazard (chemical, physical or biological).

Where these hazards may cause injury to workers, personal protective equipment must be selected to essentially eliminate the injury potential. A Job Hazard Analysis must be completed by the PI/Supervisor to identify potential workplace hazards. PPE is selected when other control methods cannot effectively protect workers. Careful consideration is required when choosing PPE, completing the JHA, and reference to a MSDS when working with hazardous substances/chemicals must be conducted.

6.4 Lab coats are an important part of PPE in a laboratory setting. The purpose of a lab coats is to protect the skin and personal clothes from hazardous materials. Lab coats offer another layer of protection between the body and the hazardous substance. Lab coats absorb or deflect particles that users may not be aware of (e.g., aerosols, dust and radioactives) because they are not visible. If a hazardous substance contacts the body, it is much faster to remove a lab coat than street clothes. Lab coats should not be worn into public places like, cafeterias, lounges etc. in order to prevent the spread of contamination.

Lab coats should be laundered on a regular basis and/or when coats become soiled, particularly with hazardous materials/chemicals. Regular laundering of lab coats will help reduce the risk of personal contamination or contamination to surfaces inside and outside of the lab. Lab coat laundering is conducted at McMaster University Medical Centre (MUMC). See Environmental and Occupational Health Support Services (EOHSS) website for details regarding laundering.

Careful consideration should be given to lab coat selection as there are many varieties that offer a wide range of protection for the user.

Some questions to consider before choosing a lab coat:

- Does your lab work primarily with chemicals, biological agents, radioisotopes, or a variety of these?
- Does your lab work involve animal handling?
- Are there large quantities of flammable materials (>4 liters) used in a process or experiment?
- Are there water reactive or pyrophoric materials used in the open air, e.g. in a fume hood instead of a glove box?
- Are there open flames or hot processes along with a significant amount of flammables?

- How are hazardous chemicals used and what engineering controls are available, e.g. a fume hood or glove box?
- Is there a significant risk of spill, splash or splatter for the tasks being done, e.g. large volume?
- What is the toxicity of chemicals used and is there concern about inadvertent spread of contamination?

Identifying the hazards in a laboratory, reviewing the MSDS and referring to the Lab Coat Selection Criteria (Appendix A) will help with determining the appropriate lab coat to be used. **If usage of substances within a lab varies, more than one variety of coat may be necessary.** The proper fit of a lab coat is imperative as a coat that is ill-fitting can compromise the user's safety. 100% Cotton or Poly/Cotton blend coat may be suitable for most operations, however if working with pyrophoric materials, extremely flammable chemicals, or large quantities of flammable chemicals treated cotton or Nomex would be more appropriate. If chemical splash is a concern, use of a rubber apron over a lab coat should be considered in these circumstances.

Appendix A is provided as a resource tool for assisting with the hazard assessment when lab coats are required.

## 7 TRAINING

7.1 Prior to conducting work or being in a PPE prescribed area requiring the use of PPE, workers/students shall be trained in the following:

- When PPE is necessary;
- What type is necessary;
- How it is to be worn;
- What its limitations are; and
- Proper care, maintenance, life expectancy and disposal.

Supervisor must provide training to ensure the worker/student is able to demonstrate, upon completion of the training, the above mentioned information. Any type of training format can be used as long as a hands-on session is incorporated. The Supervisor must have documentation of this training and proof that the training information was understood. See Appendix B.

Worker comfort should be considered when selecting PPE as it should not make tasks more difficult to accomplish.

**APPENDIX A:**

# Lab Coat Selection Criteria

| Material | Splash Resistance/ Chemical Resistance | Flame Resistance | Uses/Comment |
|---|---|---|---|
| Polyester/Cotton Blend | May be fluid resistant. Check information from manufacturer. Unknown chemical resistance. Thought to offer better protection for work with acids than cotton. | No | Most common for clinical settings (hospitals, clinical labs) and labs handling biological materials. Not considered appropriate for working with flammables. Suitable for undergraduate students.<br><br>**Warning:** Not to be worn if handling pyrophoric chemicals. |
| 100% Cotton | Not fluid resistant or fluid proof. Degraded by acids. Anecdotally, more resistant to solvents. | No. Burns less readily than poly/cotton blends, but still burns. | Good for labs where acid handling is limited and splash resistance is not a concern, and there is some work with flammables, heat and flame. Supplement with an apron for acid handling. |
| Flame Retardant treated materials (either 100% cotton or primarily cotton treated with flame retardant) | Not necessarily fluid resistant. Degraded by acids. More resistant to solvents. Not generally tested for chemical resistance. | Somewhat. | Better for lab settings with significant fire hazard, i.e. Research labs. Supplement with an apron for acid handling. More costly than non-flame retardant lab coats. May lose flame resistance with laundering over time. |
| Dupont Nomex | Unknown splash and chemical resistance. | Yes. | Good for settings where there may be an arc flash or flash fire, i.e. pyrophoric material. Used in petrochemical industry. Expensive. Flame resistance does not fade over time or with laundering. |
| Polypropylene lab coat. | No. | No. | Intended for protection from dirt, grime, dry particulates in relatively non-hazardous environment such as animal handling and clean rooms. Burns readily. Typically disposable. |
| VWR Microbreathe lab coat | Fluid resistant for blood and body fluids and chemicals | No | For clinical and biological lab settings. Not appropriate for environments with significant fire hazards present. |

## Limitations of lab coat

Lab coats are ***not*** designed to be the equivalent of chemical protection suits for major chemical handling or emergencies. There are no specific requirements in standards or guidelines for the type of protection that a lab coat is to provide.

- Lab coats are not tested for typical conditions that might be encountered in a research lab with respect to chemical use, or combined research activities.
- There is little or no information provided by manufacturers or distributors about the capability of a lab coat for a combination of hazards.
- A coat that is *flame resistant*, such as treated cotton, may not be chemical resistant or acid resistant.
- A coat that is advertised as flame resistant has not been tested with criteria involving flammable chemicals on the coat.
- The term *flame resistant* refers to the characteristic of a fabric that causes it not to burn in air. The testing criteria involves applying an open flame to the bottom edge of a strip of fabric in a test chamber for 12 seconds and then looking at char length, after flame, and after glow, testing the self- extinguishing properties of the fabric. The flame resistance test criteria were intended to simulate circumstances of a flash fire, or electric arc flash, not a chemical fire.[1]

1. Department of Environmental Health and Safety, Queen's University

## APPENDIX B:

### PERSONAL PROTECTIVE EQUIPMENT TRAINING RECORD (EXAMPLE)

**Personal Protective Equipment Training Record**

I_____ (print full name) certify that the following affected employees have received and understood personal protective equipment (PPE) training, which included the following: when PPE is necessary; what PPE is necessary; how to properly don, doff, adjust, and wear PPE; the limitations of the PPE; and the proper care, maintenance, life expectancy and disposal of the PPE.

Each of the affected employees has demonstrated an understanding of the above and an ability to use the PPE properly.

| Name | ID# | Equipment Type | Date of Training |
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(Signature):_____ (Date):_____

**Note to signer:** maintain this certification with your permanent departmental records.