McMaster University

# Risk Management Manual Program

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| Complete Program Title:<br>**Building Indoor Air Quality Management** | Risk Management Manual (RMM) Number:<br>**400** |
| Approved by:<br>DocuSigned by:<br>Roger Couldrey<br>A336B06F11DE407...<br>**Vice-President, Administration**<br><br>**President and Vice-Chancellor** | Date of Most Recent Approval:<br>**September 2020** |
| Date of Original Approval:<br>**July 2003** | Supersedes/Amends Program dated:<br>**February 2010** |
| 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 establish a program for the maintenance, assessment and control of indoor air quality that meets or surpasses existing regulations and standards for the health, safety and comfort of building occupants.

1.2 To identify a structured response mechanism to deal with air quality concerns.

1.3 To ensure compliance with the Occupational Health and Safety Act.

## 2 Scope

2.1 All McMaster University Campus buildings and off campus locations occupied by Faculty, staff, students, and visitors.

## 3 Related Documents

3.1 Occupational Health and Safety Act and Regulations, R.S.O. 1990

3.2 McMaster University Environmental Health and Safety Policy, RMM #100

3.3 Tobacco & Smoke Free University Policy

3.4 McMaster University Laboratory Safety Handbook, RMM#309

3.5 McMaster University Biosafety Program, RMM #600

3.6 McMaster University Radiation Safety Program, RMM #700

3.7 McMaster University Asbestos Management and Control Program, RMM #401

3.8 ASHRAE Standard 62.1 - 2016 – Ventilation for Acceptable Indoor Air Quality.

3.9 ANSI / AIHA Z.9.5 2012 Laboratory Ventilation.

3.10 ACGIH - Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices.

## 4 DEFINITIONS AND ACRONYMS

4.1 **Supervisor** - Person who has charge of a workplace or authority over a worker.

4.2 **Occupants** - People authorized to enter, work and study in University buildings or at off campus locations.

4.3 **Acceptable Indoor Air Quality (ASHRAE 62 .1 - 2016)** - Air in which there is no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction.

4.4 **Conditioned Space** - Part of the building that is heated or cooled, or both for the comfort of occupants.

4.5 **Contaminant** - An unwanted airborne constituent that may reduce acceptability of the air.

4.6 **Dust** - An air suspension of particles (aerosol) of any solid material, usually with a particle size less than 100 micrometers (um).

4.7 **Fumes** - Airborne particles, usually less than 1 micrometer in size, formed by condensation of vapors, sublimation, calcination, or chemical reaction.

4.8 **Microorganisms** - Any microscopic living thing, especially bacteria, fungus or a protozoan.

4.9 **Acronyms:**

- **ACGIH** – American Conference of Governmental Industrial Hygienists
- **AIHA** – American Industrial Hygiene Association
- **ANSI** – American National Standards Institute
- **ASHRAE** – American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.
- **CJHSC** – Central Joint Health and Safety Committee
- **EOHSS** – Environmental & Occupational Health Support Services
- **HVAC** – Heating Ventilation and Air Conditioning
- **IAQ** – Indoor Air Quality

- **JHSC** – Joint Health and Safety Committee
- **MOLTSD** – Ministry of Labour, Training and Skills Development
- **OHSA** – Occupational Health and Safety Act
- **PM** – Preventative Maintenance
- **SOP** – Standard Operating Procedure
- **FHSSO** – Faculty of Health Sciences Safety Office

## 5 RESPONSIBILITIES

### 5.1 Role of Senior Managers (Deans, Chairs, Directors):

Senior Managers shall:

- support the Building Indoor Air Quality Management Program through their Supervisors by following appropriate policies and operating procedures directed at stopping the release of airborne contaminants within the building;
- communicate building air quality concerns to Facility Services for main campus buildings and appropriate Engineering Services for offsite locations;
- communicate with the appropriate JHSC with regard to planned actions when requested;
- communicate unresolved air quality concerns that involve staff and students in off campus locations to the EOHSS or FHSSO;
- ensure the building renovations are conducted only after full consideration of the impact on the existing HVAC system and the need to condition the air supplied to newly created space and adjacent spaces;
- consider occupant load limitations when assigning space;
- communicate this program to landlords when renting/leasing space.

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

Supervisors shall:

- respond to occupant air quality concerns by taking appropriate action (where possible) to correct the condition or report to Facility Services and/or EOHSS or FHSSO;
- consider the potential impact to building air quality of all chemicals and products being considered for use within the occupied area;
- ensure that prescribed procedures for work with hazardous substances are followed;
- ensure that all small chemical spills are cleaned up as they occur and that all major spills are reported immediately to Security Services at ext. 88 or

905-522-4135 or to the appropriate emergency response number at off campus locations;

- ensure that all work involving asbestos is done in conformity with the Asbestos Management Control Program;
- ensure that approved fume hoods and or enclosed ventilation systems are used when setting up service, research or teaching projects involving the potential release of fumes, gas, dust or microorganisms within the occupied area;
- ensure that an SOP is in place for all such work;
- ensure that, whenever practicable, micro-scale set-ups are used in undergraduate teaching laboratories that utilize volatile chemicals;
- ensure that fume hoods, exhaust hoods and bio-containment hoods are tested on a regular basis;
- notify EOHSS and/or FHSSO of any incident involving the release or suspected release of gas, fume dust or microorganisms within the building, an injury/incident report should be completed; and
- know the occupant load limit within the area of responsibility and ensure occupant load limits in assigned space are adhered to.

### 5.3 **Role of Building Occupants** (**Faculty, Staff, Students, Visitors)**

Building Occupants shall;

- report air quality concerns to their immediate supervisor;
- work with potential air contaminants only in a prescribed manner that eliminates or reduces the contaminant to an acceptable level., using fume hoods, bio-containment cabinets etc.;
- ensure that all small chemical spills are cleaned up as they occur and that all major spills are reported immediately to Security Services at Ext. 88. or to the appropriate emergency response number at off campus locations;
- abide by the Tobacco & Smoke Free University Policy; and
- arrange for removal of (depending upon custodial arrangements), malodorous material or garbage before it impacts on the occupied area or the building HVAC system.

### 5.4 **Role of Facility Services:**

Facility Services shall:

- ensure that the HVAC systems for new buildings are designed and constructed according to current regulations, codes, standards and best practices for IAQ;
- ensure that all new systems are tested to confirm that design specifications have been met;

- ensure that building renovations are conducted only after full consideration of the impact on the existing HVAC system and the need to condition the air supplied to newly created space;
- ensure that the PM programs for HVAC systems in all main campus buildings are established and maintained on the basis of industry-wide best practices and that the programs are audited for effectiveness on an annual basis;
- assess all contracted service and construction projects for the potential impact of the work or products used (e.g. painting, roofing, demolition etc.) on IAQ and take the necessary steps to eliminate or mitigate such impact;
- communicate all potential IAQ impacts to building occupants and EOHSS/FHSSO in advance of such projects;
- ensure that all work and or projects involving contact with or removal of asbestos is conducted in compliance with the McMaster University Asbestos Management Program (RMM #401) and current Asbestos Regulations;
- ensure that IAQ concerns are responded to promptly and advise EOHSS and/or FHSSO immediately if the reported issue involves the release or suspected release of gas, fume, dust or microorganisms within the building;
- oversee the operation and maintenance of the HVAC systems;
- arrange for periodic testing of the central systems i.e. $CO_2$, air flow rates, temperature and humidity;
- arrange for building occupants to be notified of all scheduled HVAC or Fume Hood shutdowns;
- communicate with building occupants on IAQ concerns;
- liaise with EOHSS/FHSSO and the JHSC on IAQ issues;
- maintain service records for all ventilation systems and equipment;
- provide advice and guidance on air quality issues related to ventilation systems and equipment.

## 5.5 **Role of Environmental and Occupational Health and Safety Office:**

The EOHSS Office shall:

- direct Faculty of Health Sciences air quality concerns to the FHSSO;
- coordinate the investigation of air quality concerns in off campus facilities owned or leased by the University;
- respond to unresolved IAQ concerns and all issues involving suspected fumes, gas, dust or microorganisms contamination in the supply air system;
- liaise with Facility Services on IAQ/ventilation concerns where necessary;
- arrange for qualitative and quantitative analysis of suspected indoor air contaminants;
- communicate with JHSC’s on IAQ issues when requested;
- communicate with JHSC’s on IAQ issues in a timely manner and provide information and reports on IAQ investigations to the respective JHSC.

5.6 **Faculty of Health Sciences Safety Office:**

The FHS Safety Office shall:

- respond to unresolved air quality issues in facilities occupied by the Faculty of Health Sciences;
  communicate with the FHS JHSC or appropriate HHS hosted location JHSC on IAQ issues; and
- liaise with Facility Services or equivalent on IAQ/ventilation concerns where necessary.

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

The JHSC's shall:

- be advised of IAQ investigations in a timely manner and their resolution;
- provide input on the effectiveness of HVAC PM programs in problem area;
- be provided with copies of all reports concerning IAQ issues.

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

The JHSC's shall:

- be advised of IAQ investigations in a timely manner and their resolution;
- provide input on the effectiveness of HVAC PM programs in problem area;
- be provided with copies of all reports concerning IAQ issues.

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

The CJHSC shall:

- review the Building Indoor Air Quality Management Program on a scheduled basis; and
- through the minutes of the JHSCs receive and review the results of air quality investigations.

## 6 PRODCEDURAL GUIDELINES

6.1 **IAQ Assessment Criteria for Fresh Air Supply to Non Industrial Environments:**

Carbon dioxide (CO2) levels are widely used as a marker or surrogate measure for insufficient fresh air supply. The Ontario Ministry of Labour, Training and Skills Development (MOLTSD) adopts an IAQ comfort guideline of 700 ppm over outside levels, around 1000 ppm, for CO2 concentrations for use when assessing the indoor air quality of office environments and other similar indoor settings. A limit of 1000 ppm is recommended to satisfy comfort criteria.

In assessing worker exposure to CO2, a Time-Weighted Average limit (TWA) standard of 5000 ppm is utilized. This standard is prescribed by the MOLTSD as an

8-hour time-weighted average and listed in O.Reg.833/90 the Regulation for the Control of Exposure to Biological and Chemical Agents. This regulated CO2

exposure standard would be most frequently applied in a workplace setting such as an industrial or manufacturing facility.

American Society of Heating and Refrigeration Engineers (ASHRAE) Standard 55-1992 recommends temperature ranges of 20°C to 23.5°C for winter, 20°C to 27.7°C for spring/fall, and 23.8°C to 27.7°C for summer. 18 degrees is the legally mandated minimum as per the Occupational Health and Safety Act.

### 6.2 **Building IAQ Concerns:**

Building air quality concerns on main campus buildings shall be reported first to the Facility Services Customer Services Desk and all other sites to appropriate facilities management i.e. McMaster Children's Hospital – Hamilton Health Sciences.

### 6.3 **Role of Facility Services Manager:**

Arrange for periodic testing of the central systems, i.e. $CO_2$, air flow rates, temperature, and humidity.

### 6.4 **Building IAQ Investigation for Contaminants:**

Tests for specific IAQ contaminants will be coordinated by EOHSS/FHSSO in consultation with Facility Services where necessary. The JHSC will be notified in advance of all such tests and invited to be present at beginning of testing.

### 6.5 **HVAC Preventative Maintenance Program Objectives:**

The HVAC PM Program is designed to provide and maintain a clean and effective air supply system by:

i) Maintaining and cleaning filter systems as scheduled.

ii) Regular HVAC system maintenance.

iii) Regular HVAC systems performance evaluations.

iv) Good housekeeping in the mechanical rooms, i.e.no storage.

v) Keeping all HVAC system components dry (or drained at the coils).

## 7 Records

7.1 Facility Services shall maintain HVAC PM Program work and audit records for a period of three years.

7.2 EOHSS and/or FHSSO shall maintain a permanent record of IAQ investigations and associated reports.