

## **Attachment A: IAQ Regulations [R], Standards [S] and Guidelines [G]**

**American Conference of Governmental Industrial Hygienists (ACGIH), *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices***, Cincinnati OH. [R]

<http://www.acgih.org>

TLV exposure guidelines are provided for control of potential workplace health hazards based on information from industrial experience and human and animal studies. The 8-hour 'time-weighted average' (TWA), 15-minute 'short-term exposure limit' (STEL), carcinogenicity category, and 'critical effect(s)' are listed for a variety of chemicals. Federal and Provincial regulations use these TLVs with different acronyms, as the term TLV is a registered trademark.

In Ontario, the **Ministry of Labour**, Regulation 833, *Control of Exposure to Biological or Chemical Agents*, uses 'Time-Weighted Average Exposure Values (TWAEV).

**American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)**, Standard 55-2004, *Thermal Environmental Conditions for Human Occupancy*, Atlanta, GA. [S]

<http://www.ashrae.org>

The standard specifies combinations of indoor thermal environmental factors, such as air temperature, radiant temperature, air speed, and humidity, and personal factors such as metabolic rate and clothing insulation, that will produce an environment acceptable to a majority (80%) of the occupants within the space. The Standard is intended for use in design, commissioning, and testing of buildings and HVAC systems and can be applied for residential, commercial, and institutional facilities as well as other occupied spaces such as transportation vehicles.

ASHRAE Standards are now under "continuous maintenance" and revisions are incorporated and published within an established timeframe.

**ASHRAE Standard 62.2-2004**, *Ventilation for Acceptable Indoor Air Quality in Low-Rise Residential Buildings*, Atlanta, GA. [S]

<http://www.ashrae.org>

The standard specifies minimum ventilation rates in liters/second in various rooms and areas. Kitchen and bathroom exhaust are specified. Acceptable IAQ is defined as air in which "a substantial majority of occupants express no dissatisfaction with respect to odour and sensory irritation and in which there are not likely to be contaminants at concentrations that are known to pose a health risk."

## **Canada Mortgage and Housing Corporation (CMHC)**

<http://www.cmhc-schl.gc.ca>

CMHC has published Research Highlights, technical, and how-to documents for building designers, developers, specialists, consultants, and homeowners on home design, construction techniques, HVAC systems, and materials and appliance selection for good IAQ. Their aim to promote healthy housing covers issues on home building and renovation, reducing chemical contaminants, moisture control, water-damage restoration and mould remediation, and accommodating persons environmental sensitivities. CMHC also has developed a three-day Residential IAQ Investigator Course, and a workshop one day workshop on 'Build and Renovate to Avoid Mold'.

A few of their IAQ titles are;

- Indoor Air Quality, Builders' Series, 1988
- How to Improve the Quality of Air in Your Home, Consumers' Series, 1989
- IAQ Test protocol for Highrise Residential Buildings, 1990
- The Clean Air Guide, 1993
- Ventilation and Air Quality Testing in Electrically Heated Housing, 1995
- Building Materials for the Environmentally Hypersensitive, 1997
- About Your House, Home Maintenance Schedule, 2003
- Air Quality in Interior Environments, 2003
- Analysis of ventilation System Performance in New Ontario Homes, 2004
- Clean-Up Procedures for Mold in Houses, 2004 (see below)

**Canada Mortgage and Housing Corporation (CMHC)**, *Clean-Up Procedures for Mould in Houses*, 2004. [G]

<http://www.cmhc-schl.gc.ca>

<https://www03.cmhc-schl.gc.ca/b2c/b2c/init.do?language=en>

This guide, primarily for homeowners and occupants, includes advice on how to identify and correct small-scale mould problems. Contents include an Introduction; Defining the Problem; Evaluating the Problem; Fixing the Problem, and Appendix A – Mold Biology; Appendix B – Surveying Indoor Moisture and Mold; Appendix C – Preventing Moisture Problems; Appendix D – Print Resources; Appendix E – Internet Resources; and Appendix F – Testing Resources.

## **Canadian Centre for Occupational Health and Safety (CCOHS)**

<http://www.ccohs.ca/oshanswers/information/govt.html>

This center provides services for web information, MSDS database, training courses, publications and inquiries. Federal and Provincial jurisdictions (“Canadian Government Departments Responsible for OH&S”), and regulatory information are listed. Information on hazardous substances, diseases, disorders, and injuries is also provided. Other

publications include, *Indoor Air Quality Health and Safety Guide*, 1998, and *Mould in the Workplace, A Basic Guide*, 2004.

**Canadian Construction Association (CCA)**, *Mould Guidelines for the Canadian Construction Industry*, Standard Construction Document, CCA-82-2004, [G]  
<http://www.cca-acc.com>

This document was developed as a national guideline to assist contractors (and all other stakeholders) in minimizing the potential for mould growth and to institute effective remediation practices during building construction as well as in building design, operation and maintenance. Contents include; Introduction, Legal / Insurance Overview, Defining Mould, Health Risks, Construction Practices to Minimize Moisture Intrusion, Building Operation and Maintenance, Mould Assessment, Mould Remediation Guidelines (3 levels plus the HVAC system), Communication, Decommissioning / Demolition, Disposal of Mouldy Materials, and Guidelines For Selecting Mould Remediation Contractors. Appendix A provides a “Checklist for Visually Determining the Presence of Mould in an Existing Building”, and Appendix B lists mould remediation resources.

This document supercedes the New York City Department of Health, *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*, 2000.

The CCA website also contains a 12-page document, *Mould: An Informational Brochure*.

**Canadian General Standards Board**, *The Spillage Test - Method to Determine the Potential for Pressure-Induced Spillage from Vented, Fuel-Fired, Space Heating Appliances, Water Heaters and Fireplaces*, CAN/CGSB 51.71-2005, Gatineau, QC. [S]  
<http://www.pwgsc.gc.ca/cgsb/home/index-e.html>

This standard provides a test method for determining whether the depressurization of a dwelling unit by air-moving devices is sufficient to affect the ability of vented fuel-burning appliances and their venting systems to exhaust some or all of their combustion products to the outdoors.

This standard applies to dwelling units; detached, semi-detached and row housing. Row housing must be ground accessible. Units must be equipped with self-contained ventilation and venting systems. Fuel-burning appliances products of combustion are to be vented to the outdoors.

The standard establishes specific conditions of test and describes the pressure-measuring apparatus and the procedures for measuring the resultant depressurization. Included is a list of depressurization limits for specified fuel-burning appliances and their venting systems. These limits are used to assess whether the level of depressurization measured is likely to result in the spillage of combustion products within the dwelling unit.

The testing and evaluation of a dwelling unit against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any applicable regulatory requirements prior to its use.

**Canadian Standards Association**, CSA-F326-M91, *Residential Mechanical Ventilation Systems*. Etobicoke, ON. [S]

<http://www.csa-intl.org/onlinestore/GetCatalogItemDetails.asp?mat=2002871&Parent=102>

The standard defines requirements for performance, installation and application, and performance verification of mechanical ventilation systems. This Standard applies to systems that are capable of providing minimum controlled rates of ventilation air to the habitable spaces of single-family dwellings that;

- (a) Fall within the Scope of Part 9 of the National Building Code of Canada, and
- (b) Are self-contained with respect to heating, ventilation, and air conditioning.

**Health Canada (HC)**

[http://www.hc-sc.gc.ca/ewh-semt/pubs/air/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/pubs/air/index_e.html)

The Environmental and Workplace Health Unit offers information and advice on common environmental factors that affect human health; air, noise, soil and water pollution, climate change, occupational health and safety, pest control and radiation. Air quality topics include a description of pollutants and diseases, research, risk assessment, and regulations. Notable publications on IAQ and mould are; *Exposure Guidelines for Residential IAQ* (revised in 1989 and outdated), *Tools for Schools, Ultrasonic / Cool-Mist Humidifiers*, *Significance of Fungi in Indoor Air*, *Fungal Contamination in Public Buildings: A Guide to Recognition and Management*, 1995 (removed from circulation), and the documents listed below; *IAQ in Office Buildings: A Technical Guide*, and *Fungal Contamination in Public Buildings: Health Effects and Investigative Methods*.

**Health Canada**, *Indoor Air Quality in Office Buildings: A Technical Guide*, A Report of the Federal-Provincial Advisory Committee on Environmental and Occupational Health, Health Canada, 1995. [G]

[http://www.hc-sc.gc.ca/ewh-semt/pubs/air/office\\_building-immeubles\\_bureaux/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/pubs/air/office_building-immeubles_bureaux/index_e.html)

This document is a guideline for conducting IAQ investigations and assessments in office buildings. Factors and sources affecting IAQ, a communication strategy, and an assessment protocol are described. Exposure criteria for comfort are addressed for individual parameters and pollutants, and a checklist, measurement methods and equipment, and strategy for remediation is provided for; thermal comfort, ventilation, the HVAC system, air motion, CO, formaldehyde, particulates, VOCs, and microbials. This is a good primer on general IAQ issues that can be applied to residences.

**Health Canada**, *Fungal Contamination in Public Buildings: Health Effects and Investigative Methods*, 2004. [G]

[http://www.hc-sc.gc.ca/ewh-semt/pubs/air/fungal-fongique/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/pubs/air/fungal-fongique/index_e.html)

This document is a revision of *Fungal Contamination in Public Buildings: A Guide to Recognition and Management*, 1995, which has been removed from circulation. The purpose of the report is to assist public health workers and others in the management of potential health risks associated with fungal contamination. Two sections are presented; the first is a review of internationally published studies of the health effects of indoor moulds, a discussion of potential effects in sub-populations, an overview of experimental studies on respiratory effects of moulds, and a discussion of the evidence linking mould exposure to adverse health outcomes.

The second part is a guide for the investigation of mould contamination in non-industrial workplaces. Sections include a Background, General Principles, Objectives of a Mould Investigation, and Methodological Considerations.

**Institute of Inspection Cleaning and Restoration (IICRC)**, *S500, Standard and Reference Guide for Professional Water Damage Restoration*, Vancouver, Washington, 1999. [G]

<http://www.iicrc.org>

A procedural standard for use by those involved in the water damage restoration industry and a supplementary reference guide. The Standard addresses; Loss Assessment and Evaluation, Categories of Water, Principles of Drying, Structural and Contents Restoration, Monitoring, Final Inspection and Completion. The Reference Guide includes the following chapters; Microbiology Associated with Water Damage, Health Effects Associated with Microbial Contamination, Biocides and Antimicrobials, Employee Health and Safety, Occupational Exposure, Psychrometry, Water Damage Restoration Drying Equipment and Tools, Communication and Administrative Procedure, Inspection and Evaluations, Third-Party Evaluation of Remediation Effectiveness and Project Completion, Carpet Disengagement and Reinstallation, an Appendix, Regulation of Pesticides, and a Glossary.

**Institute of Inspection Cleaning and Restoration**, S520, *Standard and Reference Guide for Professional Mold Remediation*, Vancouver, Washington, 2004. [G]  
[www.iicrc.org](http://www.iicrc.org)

This ‘consensus standard’ is intended to provide information about the remediation of mould-damaged structures and contents. Written primarily, for remediation companies it can be also used by persons who investigate mould complaints, write remediation specifications, protocols, or procedures, and manage remediation projects. The document is in two parts; a procedural Standard and a Reference Guide that supports the Standard and provides background information.

The Standard sections consist of; Principles of Mold Remediation, Contractor Qualifications, Safety and Health, Administrative Procedures and Insurance, Limitations, Complications, Complexities and Conflicts, Inspection and Preliminary Determination, Structural Remediation, HVAC Remediation, Contents Remediation, Post-Remediation Verification, Final Documentation, and Indoor Environmental Professionals. Appendices contain Mould Remediation Certification Authorities, and Suggested Guidance for the Selection and Use of Respiratory Protection During Mold Remediation. A Glossary of Terms, Sources, Abbreviations, Industry Acronyms, and Source Acknowledgement is also included.

**National Research Council Canada** (NRC), *National Building Code of Canada* (NBC), 2005.  
[http://www.nationalcodes.ca/nbc/index\\_e.shtml](http://www.nationalcodes.ca/nbc/index_e.shtml)

The NBC apply to the construction of buildings, including extensions, substantial alterations, building undergoing a change of occupancy, and upgrading of buildings to remove an unacceptable hazard. Ventilation requirements for residences are also included.

**Natural Resources Canada** (NRCAN) [S]  
<http://oee.nrcan.gc.ca/residential/personal/index.cfm?text=N&printview=N>

The R-2000 Standard for low-rise, detached, semi-detached, and row houses provides technical requirements and measures for the efficient use of energy, improved IAQ, and better environmental responsibility in the construction and operation of a house. Topics covered are building envelope requirements (insulation, airtightness, window performance), mechanical systems (heating and cooling appliances, ventilation, water heaters, and fireplaces). R-2000 Technical Information includes a paper on *How a Heat Recovery Ventilator Works*.

The R-2000 Indoor Air Quality and Environmental Features Pick-List recommends design, construction, and material selection features such as; moisture control, drainage,

slab depressurization, framing, wall/floor/insulation/finishing materials, and filter performance.

**U.S. Environmental Protection Agency**

<http://www.epa.gov/iaq>

The EPA “IAQ Topics” home page lists an alphabetical subject index from A to Z listing 82 topics. Included subjects can be categorized by Molds and Moisture, Asthma, Secondhand Smoke, Radon, IAQ Tools for Schools, IAQ Design Tools for Schools, IAQ in Homes, IAQ in Large Buildings, Partnership for Clean Indoor Air, Homeland Security and Indoor Environments, and Interagency Committee on IAQ. Notable publications include; *Should You Have the Air Ducts in Your Home Cleaned, Use and Care of Home Humidifiers Residential Air Cleaners, The Inside Story: A Guide to IAQ, Mold Remediation in Schools and Commercial Buildings.*

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