



IAQ "Everything Sheet" and References – 20080908

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*Additions or Corrections Solicited! Send these via email to Dr. James R. Tucker. Email: jim@emssales.net

AIRBORNE ALLERGENS AFFECT OUR HEALTH!

There is NO prejudice for economic or social status!

Affected Immuno-Compromised Individuals include:

Elderly, Children, Cancer and Transplant Patients.

Allergic reactions include hypersensitivity pneumonitis allergic rhinitis, and some types of Asthma. Infectious illnesses, such as influenza, measles and chicken pox are transmitted through the air. Molds and mildews release disease causing mycotoxins. Symptoms include sneezing, watery eyes, coughing, shortness of breath, dizziness, lethargy, fever, and digestive problems.

There are no exposure limits for Fungal Spores, Bacteria, Viruses, Animal Dander & Cat Saliva, Dust Mites, Insects, Pollen, or Environmental Tobacco Smoke

Non-Viable Samples Flow Rate/Area

Micro-5	5 min. @ 5 lpm
Allergenco - D	10 min. @ 15 lpm
Cyclex, Cyclex-d	1-10 min. @ 20 lpm

Viable Samples	Flow Rate/Area
Andersen Type	2-5 min. @ 28.3 lpm
Bulk	~ 2 square inches
Vacuum	~20 ft ² or ~15 mg Dust
Swab	~1-4 square inches

Media

CEL=Cellulose Agar – Molds on Sheetrock & Wood

CMA=Corn Meal Agar – Dermatophytes and Cellulosic Fungi (Not Common in IAQ)

DG18 Agar Dichloran 18% Glycerol Agar – Xerophilic (low water activity) Fungi in Carpets, etc.

MEA Agar – Malt Extract Agar –Versatile All Purpose Media (medium to high water activity).

IAQ PROTECTION FACTORS

Source Control, Ventilation, Air Cleaners

1) Inspect Semi-Annually - Summer & Winter

HVAC Duct Insulation, Crawl Space, Sills & Joists, Ceilings, Roof & Attic, Plumbing

2) Prevent Moisture Build-Up

Repair Plumbing Leaks, Repair Roof Leaks, Ventilate Baths & Kitchens, Ventilate Attics & Basements, Insulate HVAC Ducts, Vapor Barrier in Crawl Spaces & Walls, Drain & Clean Drip Pans, Maintain Good Air Flow, Remove Vinyl Wallpaper, Dry Floors & Carpets Quickly & Thoroughly

INTERNET REFERENCES

- 1) IAQ Equipment Environmental Monitoring Systems
Sampling Cassettes, Pumps, Calibration Equipment, Microscopes, Air Scrubbers, HEPA Vacuums, Respirators, PPE, IAQ Disinfectants and related IAQ Supplies. 3864 Leeds Avenue, Charleston, SC 29405, TEL 800-293-3003, <http://www.emssales.net>
- 2) Code of Federal Regulations – <http://www.gpoaccess.gov/cfr/index.html>
- 3) Melina Bill - <http://www.govtrack.us/congress/bill.xpd?bill=h109-1269>
- 4) OSHA - <http://www.osha.gov/dts/shib/shib101003.html>
- 5) Real Estate Disclosure - <http://www.moldmart.net/seller-real-estate-buyer-disclosure.htm>
- 6) National Institute of Building Sciences – LBP O&M and Specification <http://www.nibs.org/>
- 7) RS Means –Remediation Cost Estimation – <http://www.rsmeans.com>
Repair and Remodeling
- 8) American Institute of Architects - <http://www.aialongisland.com>
- 9) EMPAT Labs <http://www.aiha.org/Content/LOAP/accred/EMLAP.htm>

California Department of Health Services (CDHS) Info Sheets:

<http://www.cal-iaq.org/iaqsheets.htm>

- 10) Mold in My Home: What Do I Do? (HTML) http://www.cal-iaq.org/MIMH_2006-06.pdf
- 11) Mold in Workplace - HESIS Infosheet
<http://www.dhs.ca.gov/ohb/HESIS/molds.pdf> (in PDF) (March 2001)
- 12) Mold in My School: What Do I Do? <http://www.cal-iaq.org/MoldinMySchool.pdf>
- 13) Fungi and Indoor Air Quality
http://www.dhs.ca.gov/ehib/ehib2/topics/fungi_indoor.html (May/June 1996)
- 14) Health Effects of Toxin-Producing Molds in California
http://www.dhs.ca.gov/ehib/ehib2/topics/toxin_producing.html (April 1998)
- 15) *Stachybotrys chartarum* (atra) — a mold that may be found in water-damaged homes
<http://www.dhs.ca.gov/ehib/ehib2/topics/stachygp00.doc> (Nov. 2000)
- 16) Misinterpretation of *Stachybotrys* Serology
<http://www.dhs.ca.gov/ehib/ehib2/topics/Serologyf2.html> (Dec. 2000)
- 17) State Health Department Issues Warning On Indoor Molds
<http://www.applications.dhs.ca.gov/pressreleases/store/PressReleases/13-98.html> (March 1998)
- 18) California Research Bureau Report: *Molds, Toxic Molds, and Indoor Air Quality* <http://www.library.ca.gov/crb/01/notes/v8n1.pdf> (March 2001)
- 19) NEW! California Legislation on indoor mold (taking effect January 2002): *SB 732, Ortiz, Toxic Mold Protection Act of 2001*
http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=sb_732&sess=PREV&house=B&author=ortiz
- 20) CDHS' *SB 732 Implementation Update*
<http://www.dhs.ca.gov/iaq/Mold/SB732update.htm> (March 2003 update)

U.S. Environmental Protection Agency

- 21) NEW! *Guidance for Clinicians on the Recognition and Management of Health Effects Related to Mold Exposure and Moisture Indoors*
<http://www.oehc.uchc.edu/CIEH.asp>
- 22) NEW! *A Brief Guide to Mold, Moisture, and Your Home*
<http://www.epa.gov/iaq/molds/moldguide.html> (April 2002)
- 23) *Mold Remediation in Schools and Commercial Buildings*
<http://www.epa.gov/iaq/molds/index.html> (March 2001)
- 24) IAQ Tools for Schools Appendix: *Mold and Moisture*
<http://www.epa.gov/iedweb00/schools/tfs/guideh.html> (Last modified: Jan. 2001)
- 25) Asthma and Indoor Environments: About Mold
<http://www.rabies.ncdhhs.gov/epi/air/homes.html>

26) Building Air Quality: A Guide for Building Owners and Facility Managers Appendix C
http://www.epa.gov/iaq/largebldgs/pdf_files/sec_6.pdf

27) Moisture, Mold and Mildew:
http://epa.gov/iedweb00/largebldgs/pdf_files/appenc.pdf

New York City Department of Health:

28) [Facts About Mold](http://www.nyc.gov/html/doh/html/epi/epimold.shtml) <http://www.nyc.gov/html/doh/html/epi/epimold.shtml>

29) [Guidelines on Assessment and Remediation of Fungi in Indoor Environments](http://www.nyc.gov/html/doh/html/epi/moldrpt1.shtml) <http://www.nyc.gov/html/doh/html/epi/moldrpt1.shtml>

State & Other Stuff -

30) [Minnesota Department of Health -- Fact sheets on Mold](http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html) including Mold in Homes, Indoor Mold: Health Hazard Identification and Control Mold/Moisture Resources on the Internet Public Health Concern Related to Flooding, Cleaning Up Your Business after a Flood, Investigating Mold in Public Schools

<http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html>

31) New Jersey Department of Health, Public Employees Occupational Safety & Health Program: [Indoor Bioaerosols](http://www.state.nj.us/health/eoh/peoshweb/bioaero.htm)
<http://www.state.nj.us/health/eoh/peoshweb/bioaero.htm>

32) Kansas State University: Controlling Mold Growth in the Home
<http://www.engext.ksu.edu/moisture/mf2141.pdf>

33) University of Montana (Healthy Indoor Air for America's Homes Project): [Eliminate Molds, Excessive Moisture and Other Biological Pollutants](http://www.montana.edu/wwwcxair/facts_mold.html) http://www.montana.edu/wwwcxair/facts_mold.html

34) Canada Mortgage & Housing Corp.: FLOODS: What to do before and after
<http://dsp-psd.pwgsc.gc.ca/Collection/D82-34-2001-1E.pdf>

35) CDC's MMWR Weekly: Update: Pulmonary Hemorrhage/Hemosiderosis Among Infants --- Cleveland Ohio, 1993-1996
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4909a3.htm>

36) American Academy of Pediatrics Position Paper: Toxic Effects of Indoor Molds (RE9736)
<http://aappolicy.aappublications.org/cgi/content/full/pediatrics%3b101/4/712>

37) American Phytopathological Society: [Stachybotrys chartarum: the Toxic Indoor Mold](http://www.apsnet.org/online/feature/stachybotrys/) <http://www.apsnet.org/online/feature/stachybotrys/>

38) Environmental Microbiology Laboratory, Inc.: [An index of some commonly encountered mold genera](http://www.emlab.com/app/fungi/Fungi.po)
<http://www.emlab.com/app/fungi/Fungi.po>

39) Fungal Research Group, Inc.: [Information on Mold](http://www.fungalresearchgroup.com/)
<http://www.fungalresearchgroup.com/>

40) [Institute of Inspection, Cleaning and Restoration Certification](http://www.iicrc.org/)
<http://www.iicrc.org/>

41) Texas Mold Regulations & Licensing -
http://www.certifiedmoldinspectors.com/texas_mold_license.htm

HONG KONG IAQ

42) Hong Kong's IAQ Quality Rating System
<http://www.ciihk.org.hk/conference2005/Powerpoints/14%20Mr.%20Roy%20Y%20K%20Tang/Roy%20Y.%20K.%20Tang.pdf>

HEALTH CANADA IAQ

43) Links to Health Canadian Studies - <http://www.hc-sc.gc.ca/ewh-smmt/air/in/index-eng.php>

IAQ REFERENCE BOOKS:

- 1) Builder's Guide -Hot-Humid Climates by Joseph Lstiburek, Ph.D., P.Eng., <http://www.buildingscience.com>, TEL 978-589-5100
- 2) Clearing The Air: Asthma and Indoor Air Exposures, by Institute of Medicine, 0-309-06496-1, <http://www.nap.edu>
- 3) Indoor Air Quality and HVAC Systems by David W. Bearg, P.E., 0-87371-574-8
- 4) Risk Assessment and Indoor Air Quality, Edited by Elizabeth L. Anderson and Roy E. Albert, TEL 1-56670-323-9
- 5) Sick Buildings: Definition, Diagnosis, and Mitigation by Thad Godfish, Ph.D., C.I.H., 1-87371-346-X
- 6) Basic Environmental Health, Annalee Yassi, Tord Kjellstrom, Theo deKok, Tee L. Guidotti, 0-19-513558-X,
<http://www.oup.com>
- 7) Medically Important Fungi: A Guide To Identification Davis H. Larone, Ph.D. 1-55581-091-8
- 8) Bioaerosols: Assessment and Control, Edited by Janet Macher. Sc.D., MPH. 1-882417-29-1, <http://www.acgih.org>, E-mail: comm@acgih.org
- 9) Air Sampling Instrument Selection Guide: Indoor Air Quality David K.N. Leong, Ph.D., P.Eng., CIH, Charles S. McCammon,

Ph.D., CIH Lee E. Monteith, MS., CIH Yung-Sung Cheng, Ph.D. Mary Lynn Woebkenberg, Ph.D. Janet M. Macher, ScD., MPH 1-882417-27-5, <http://www.acgih.org>, E-mail: mail@acgih.org

- 10) Atlas of Clinical Fungi -- 2nd edition G.S. de Hoog, J. Guarro, J. Gene & M.J. Figueras 90-70351-43-9 Key to fungus identification with techniques in collecting/examining samples
- 11) Basic Environmental Health, Annalee Yassi, Tord Kjellstrom, Theo de Kok, Tee L. Guidotti, 0-19-513558-X, www.oup.com
- 12) Bioaerosols Assessment & Control, Janet Macher editor, 882417-29-1, Basic information on sampling plans, building walkthroughs, sample analysis, health effects of bioaerosols, sample analysis, and data interpretation.
- 13) IICRC S520, Standard & Reference Guide for Professional Mold Remediation, Institute of Inspection Cleaning & Restoration, IE Institute, Indoor Air Quality Association Inc., www.iicrc.org (360) 693-5675
- 14) Indoor Air Quality and HVAC Systems, David W. Bearg, P.E., 0-87371-574-8, www.crcpress.com
- 15) Risk Assessment and Indoor Air Quality, Elizabeth L. Anderson, Roy E. Albert editors 1-56670-323-9
- 16) Sick Buildings: Definition, Diagnosis, and Mitigation Thad Godfish, Ph.D., C.I.H., 1-87371-346-X

MICROSCOPY & AEROBIOLOGY ID REFERENCES:

- 17) Dictionary of the Fungi -- 9th edition, P.M. Kirk, P.F. Cannon, J.C. David, J.A. Stalpers, 0-85199-377-X
- 18) Field Guide for the Determination of Biological Contaminants in Environmental Samples, H. Kenneth Dillon et al, 0-932627-76-5, AIHA Biosafety Guide
- 19) Introduction to Food- and Airborne Fungi -- 6th edition, Robert A. Samson, Ellen S. Hoekstra, Jens C. Frisvad, Ole Filtenborg, 90-70351-42-0, Key to fungus identification with techniques in collecting/examining samples. Excellent pictures of colonies. Good for identifying Penicillium sp.
- 20) Introductory Mycology -- 4th edition, C.J. Alexopoulos, C.W. Mims, M. Blackwell 0-471-52229-5, Description of each Phylum of fungi.
- 21) Manual of Environmental Microbiology -- 2nd edition Christion, J. Hurst editor, 1-55581-199-X, Intro to Environmental Microbiology, Methodology, Public health, Aquatic environments, Soil, Aerobiology, Biotransformation/Biodegradation, Subsurface and Landfills.
- 22) Medically Important Fungi: A Guide to Identification, Davise H. Larone, Ph.D., 1-55581-091-8, www.asmsa.org
- 23) Sampling & Identifying Allergenic Pollens & Molds, an Illustrated Identification Manual for Air Samplers, E. Grant Smith 0-930961-02-, Photomicrographs of mold and fungi, equipment overview, and fungal allergens.
- 24) Soil & Seed Fungi Morphologies of Cultured Fungi & Key to Species -- 2nd edition Tsuneo Watanabe, 0-8493-1118-7, Key to fungus identification of soil fungi with good drawings of specimens.
- 25) Worldwide Exposure Standards for Mold and Bacteria, Robert C. Brandys and Gail M. Brandys, http://www.safety-epa.com/mold_exposure_book.htm
- 26) Post-Remediation Verification and Clearance Testing for Mold and Bacteria - Risk Based Levels of Cleanliness Assurance, Robert C. Brandys and Gail M. Brandys, http://www.safety-epa.com/post_remediation_book.htm