Practical Solutions, Fast & On Budget!

MOULD AND INDOOR AIR QUALITY SERVICES

***DST** is a firm of engineers, scientists and contractors providing comprehensive services for mould and indoor air quality (IAQ) concerns for over 20 years.*

Mould Investigations

DST performs assessments of mould contamination within indoor environments including building envelopes, interior finishes, basement walls, HVAC systems and other building components affected by mould. Investigations include visual observations, moisture probes, field microscopes, boroscopes and other intrusive testing methods.

Mould Sampling and Air Testing:

Industry standard procedures and methods are used for selection, acquisition and laboratory submission of bulk mould and air samples. Sampling methods are used to analyse both viable and non-viable mould spores. Air tests can be performed with Air-O-Cell, RCS and MK-3 sampling methods.

Professional Mycologist

DST's professional mycologist provides analyses of microbiological samples, interpretation of the test results and gives evaluations of mould exposure risk in the environment. With over twenty years of experience as both a mycologist and IAQ investigator he brings one of the most thorough understandings of his role to the investigation of indoor fungi.

Fig. 1: Microscopic image of *Stachybotrys atra* spores.

Boroscope Inspections:

DST provides rapid inspections inside concealed areas using a fibre optic Boroscope probe. Inspections are performed inside walls, floors and ducts with minimal disturbance, as the probe hole is smaller than 10 mm in diameter. Inspected areas can be recorded with digital cameras or video recorders.

Mould Investigation Reports:

Mould investigation reports are provided to the Client, summarizing the findings and laboratory results. Recommendations include discussions on risk levels, remediation options, mould prevention plans and, if necessary, mould abatement strategies.

Risk Assessments:

DST assesses the factors that determine risk levels to occupants, including: distinguishing emergencies from routine situations; providing on-site preliminary assessments of risk and identifying situations that require expert mycological participation.

Mould Abatement:

During the abatement phase, DST provides: detailed remediation specifications; drawings and tender documents; terms of reference for selecting a suitable contractor; contractor supervision; implementation of procedures to protect occupants from hazardous exposures; project management; coordination of activities; scheduling; budget control; quality control; clearance testing.

Mould Prevention:

DST provides recommendations including preventative maintenance practices to reduce the future risk of mould development. Locations, conditions and materials at risk to mould growth are identified. Building components and their related design are evaluated with respect to mould growth.

Mould Awareness Training:

DST trains personnel in the areas of mould recognition, containment and abatement specifications and procedures. This is particularly important for mangers of facilities.

DST CONSULTING ENGINEERS INC.
Toronto Ottawa Sudbury Thunder Bay Dryden Kenora
Phone 800 668 4201 E-mail dst@dstgroup.com Web: www.dstgroup.com

MOULD AND INDOOR AIR QUALITY SERVICES

Microbial Testing

Microbial air and dust sampling are performed to evaluate the biological aspects of the indoor air environment. Areas of main concern include the air delivery system, mechanical ventilation rooms, areas formerly impacted by moisture damage and areas adjacent to crawlspaces and basements.

DST's microbial testing programs are designed to provide a *qualitative and quantitative* evaluation for microbial in the indoor air flora.

All laboratory analyses are conducted by a professional mycologist, who can provide expert interpretation of laboratory microbial analyses. DST has the unique capability and mycological expertise to rapidly set up mobile labs and conduct on-site identification of mould samples when rapid action is essential for the Client.

DST investigates microbial contamination indoors by combining on-site inspections, moisture meter readings and bulk sampling with appropriate combinations of RCS testing and DG-18 agar plate testing. Brief descriptions of these procedures, along with their relative advantages and disadvantages are presented below.

RCS Testing

The Reuter Centrifugal sampler (RCS) has become a recognized standard in IAQ work (Fig. 2). It uses prepared agar strips that are positioned around a fan, which draws air into and impinges fungal spores onto a nutrient agar.

Fig. 2 RCS sampler

Viable spores and mycelium grow into visibly identifiable colonies that can be counted. Spore counts can be highly variable depending on the season of the year and the quantity of unfiltered fresh air ventilation, but an experienced mycologist can "read" the results and determine if any indications of indoor growth are present. Results are available within a week. The test is very sensitive when low levels of contamination are present.

MK-3 or Air-O-Cell Testing

These samplers deposit the room dust on silicon coated microscope slides (MK-3) or on Air-O-Cell cassettes for direct microscopic examination of fungal spores. Significant levels of microbial contamination are easily detected by our professional mycologist. Spores can readily be distinguished from dust particles that are present in air samples. The patterns of chains and groups of spores on the slide are clues that reveal the close presence of parent colony. These sampling methods can detect both viable and non-viable spores and spores which may not germinate on agar.

DG-18 Agar Plate Samples

Compressed air is used to deflect dust off any flat surface where it is collected onto a petri plate filled with Dichloran Glycerin Agar (Fig. 3).

Fig. 3 DG-18 agar plate sample

This selective media is a preferred choice of many IAQ investigators because it slows fungal growth, keeping colonies discrete and allowing the ease of quantitative interpretation. Increased numbers of different moulds can be detected using this media when compared with most other media. The fungal

colonies that develop provide the investigator with a historical picture of what has happened at the investigation site in terms of recent mould deposition. Fungal colonies, which periodically release spores and which may not be active at the time of the investigation, leave their signature in the dust. An astute investigator recognizes patterns indicative of indoor mould colonies and can begin the trace-back to the source.

DG-18 agar plate dust samples in conjunction with the RCS air samples, can determine a historical picture of the actual dust and mould spores which have settled in the environment over an extended period of time.

Other Indoor Air Quality Parameters

The most commonly measured indoor air quality parameters include: carbon dioxide (CO_2); carbon monoxide (CO); temperature (T); and relative humidity (RH).

Carbon dioxide measurements assist in evaluating the adequacy of the ventilation for the building mechanical systems. Carbon monoxide measurements evaluate any sources of combustion gases entering the building indoor air, i.e. an exterior parking facility.

Temperature and humidity levels are measured to evaluate the environmental discomforts to the indoor environment and the thermal comfort zones defined by ASHRAE Standard 55-1992.

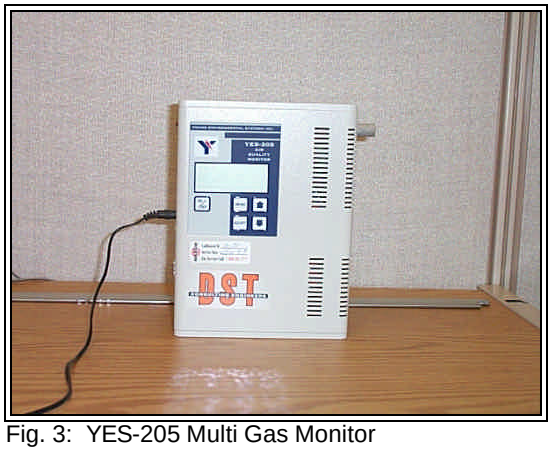

Fig. 3: YES-205 Multi Gas Monitor

An indoor air quality investigation may require the measurement of other parameters, such as VOC's, chemicals, gases, or micro fine dusts. Testing programs can be tailored specifically to the Client's needs.

Industry Standards and Guidelines

Investigations are conducted in accordance with applicable industry standards and guidelines as noted below:

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), ASHRAE Standard 55-1992, Thermal Environmental Conditions for Human Occupancy.
2. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), ASHRAE Standard 62-2001, Ventilation for Acceptable Indoor Air Quality.
3. American Conference of Governmental Industrial Hygienists (ACGIH), TLV's and BEI's., 2000.
4. Health Canada, Exposure Guidelines for Residential Indoor Air Quality, Revised July 1989.
5. Health Canada, Indoor Air Quality in Office Buildings: A Technical Guide, Revised 1995.
6. National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services. Manual of Analytical Methods.
7. United States Environmental Protection Agency, Introduction to Indoor Air Quality: A Reference Manual, July 1997.
8. New York City Department of Health, "Guidelines on the Assessment and Remediation of Fungi in Indoor Environments", April 2000.