

INDOOR AIR IN ICE FACILITIES

– Understanding the Issues

May 1, 2007

The recent identification of elevated levels of ultrafine particulate (UP) matter in some Canadian ice rinks has led all provinces and territories to reevaluate their current information and testing protocols.

The independent review of 42 Canadian ice facilities which identified a new potential problem is the latest development in an indoor air quality (IAQ) issue that has been a high priority for all Canadian recreation facilities managers since the 1980s.

For the past 25 years, every provincial and territorial recreation facilities association, including the Ontario Recreation Facilities Association (O.R.F.A.), has produced and circulated information on air quality in arenas. The largest association of arena managers in the United States has established industry best practices for monitoring and controlling air quality in ice facilities.

All professional organizations include regular updates and reminders on air quality issues as part of their training curriculum, regularly publish new information relating to air quality in their publications and many post the latest information on their web-sites to make it widely available at no cost.



Background

Indoor air quality (IAQ) problems in arenas can be caused by many factors. The identified contributors to IAQ problems include: ventilation system deficiencies, overcrowding, tobacco smoke, microbiological contamination, outside air pollutants, cleaning chemicals and refrigerants as well as off-gassing from materials and mechanical equipment.

Elevated levels of carbon monoxide and nitrogen dioxide in ice facilities have been specific cause for alarm in the past.

Ice resurfacing equipment has often been identified as the primary contributor to poor IAQ in arenas. Manufacturers now are committed to meeting or exceeding the standards for complete combustion of fossil fuels indoors. But aging ice resurfacers may not continue to meet the standards they met when they were new.

Aging affects all equipment in an arena, which may affect IAQ.

A building ages as well, and in the cool, damp environment typical of arenas, corrosion and mold can lead to additional IAQ problems.

In an ever-changing situation, arena managers are trained to watch for all indicators of changes in air quality. Some of the key questions they ask on a regular basis include:



1. Is ice cleaning equipment being maintained by a qualified professional on a regular basis?

INDOOR AIR IN ICE FACILITIES

– Understanding the Issues

2. Is the facility ventilation systems adequately designed to handle air exchange? Is it being used according to specifications? Is it being properly maintained by qualified professionals?
3. Is there an air quality testing program for the facility? Is it a sophisticated system that does spot checks during high-use periods to help determine what levels of contaminants exist and determine if corrective measures are needed?
4. Are concession foods, cleaning supplies, refrigerant leakage, or public area heating systems contributing to IAQ problems? Are monitoring, use and ventilation standards being properly applied in every part of the building?
5. What effect is outdoor air quality having on IAQ? Ventilating an indoor arena during a smog alert may not improve IAQ. Arenas near busy highways or in industrial areas may have IAQ problems that originate outdoors, out of the arena manager's control.
6. Is there an identified (or hidden) mold problem in the building?



Over the past 25 years, awareness has proven to be the best tool for managing IAQ issues.

Facility staff members who understand the importance of ventilating or purging the building on a regular basis can prevent harmful contaminants from collecting.

When buildings are renovated or new equipment is purchased, staff members who are aware of IAQ can encourage investment in enhanced

ventilation systems and choose ice cleaning and other equipment that has been designed to reduce IAQ problems.

Applying 25 Years Of Experience To The Latest Identified Problem: Ultra-Fine Particulates

The network of facility operational professionals operating through the Canadian Recreation Facilities Council (CRFC) has allowed some review of the 42 test sites used in the recent study that draws attention to elevated levels of ultrafine particles.

Each ice facility in Canada is unique, with its own construction, mechanical design and operational flaws or positive attributes.

Many of the 42 buildings in the ultrafine particle study are old or aging, which is often a contributing factor for IAQ problems. Many older facilities were poorly designed with respect to ventilation and air flow.

If the age of the building or the design of the ventilation system proves to be directly related to levels of ultrafine particles, then arena managers may be able to identify the steps that need to be taken to correct the problems. Getting action, however, often depends on municipal councils voting funds for the retrofits or renovations and this can be a lengthy process.

Was outdoor air quality related to the ultrafine particles found in the indoor air of the 42 arenas? Many of Canada's ice facilities began their life in a rural setting with little or no urban growth. Over time, vehicular traffic in close proximity to the arena has increased, manufacturing plants have arrived and the overall outdoor air quality in some locales has deteriorated. O.R.F.A. has urged our members to ventilate but the time has come when we must start considering the impact of outdoor air that has quality problems. Consider what might happen when we mix existing internal air contaminants with outdoor air contaminants and what results may occur? Could it be that poor internal air quality is sometimes in part a result of a larger environmental issue?

INDOOR AIR IN ICE FACILITIES

– Understanding the Issues



O.R.F.A. members, who work for extended periods in ice facilities, have the most at stake when it comes to maintaining safe indoor air quality levels.

The O.R.F.A. wants answers so that proper measures can be put in place to protect everyone who is in an ice arena environment.



Municipal Health & Safety Association Speaks to: Particulate Matter

The Municipal Health and Safety Association (MHSA) has long recognized particulate matter as an atmospheric pollutant. While larger diameter particles have been the main concern in the past, ultrafine particle (UFP) research is an emerging topic and is a relatively new field of investigation.

UFPs are considered to be a significant human health concern because of the variable composition and the ability of these particles to penetrate deeply into the respiratory tract.

The potential human health impacts from exposure to UFPs are primarily respiratory-related illnesses. This is largely due to the size of UFPs (relative to their mass) and their ability to deposit deeply in the lung. People suffering from asthma and other respiratory ailments have been identified as especially sensitive to air pollution. In relatively recent studies, a very consistent picture has emerged between the levels of air pollution (especially fine fraction particles) and increases in significant negative respiratory effects.

Recent advances in technology have increased the ability to measure ultrafine particles and revealed a new potential human health concern related to particles and air quality.

The measurement of ultrafine particles (UPs) is highly complex and generally involves sophisticated and expensive equipment. Particles below 1 μm diameter are of particular concern to researchers and industrial/occupational hygienists involved in the health-effects of ultrafine particles.

Ultrafine Particle Counting equipment is available for industrial hygienists to use in exposure-monitoring investigations. This equipment is expensive to purchase but is available at daily rental rates. This instrument should be operated by an Occupational Hygienist who has significant knowledge, training and experience with instrumentation and sampling protocols. At a minimum, indoor and outdoor air comparisons need to be made to determine indoor air quality. Municipal Health and Safety Association field staff can provide assistance with sampling protocols.

Those who work in ice facilities are protected under the Occupational Health and Safety Act [OHSA]. An expected elevated level of air contaminants in any work environment is cause to implement a "work refusal". Arena workers are encouraged to work with their Joint Health and Safety Committee on such issues.

The general public is not protected under the OHSA and as such they must approach their personal safety in a different way. It is reasonable for any person who enters a public ice arena to make inquires of facility staff to

INDOOR AIR IN ICE FACILITIES

– Understanding the Issues

reinforce their confidence that those who control these facilities are remaining diligent.

Air Quality Management

The following 10-questions are offered as an internal check and balance for all ice rink operations – facility managers should be able to answer each question with confidence.

They should also be prepared to answer these same 10 questions should any member of the general public step forward with the list.

All answers should be answered YES. If they can not be answered yes, then remedial action should be taken immediately.



10-Questions to Ask Your Arena Manager on Air Quality in Their Facility

	Question	Yes	No
1.	Does this facility conduct air quality tests on a regular basis?		
2.	Does it have and maintain a facility air testing log?		
3.	Does the local Public Health unit conducted air quality tests in this facility?		
4.	Is the ice cleaning equipment maintained by a professional who is properly trained in such matters?		
5.	Is the Heating-Ventilating-Air Conditioning and Refrigeration (HVAC) equipment regularly maintained by a professional who is properly trained in such matters?		
6.	Does this facility have a training plan for all staff in		

	regards to awareness on the issue of poor air in facilities, how to identify and respond to poor air situations?		
7.	Does the facility have a manual ventilation requirement for staff or a well maintained automatic sensor system that is regularly calibrated in place?		
8.	Is there a mold management plan in place for the facility?		
9.	Does the facility have a copy of the O.R.F.A.'s Air Quality Guidelines on file?		
10.	Does the facility actively monitor emerging issues that can affect indoor air quality or the industry as a whole by reading relevant publications or attend industry related training opportunities?		



Recreation Facility Air Quality Testing Protocol

Professional facility managers across North America are indebted to everyone who focuses attention on the important issue of air quality in arenas. Public safety and our own safety in arenas are among our highest priorities.

This issue of ultrafine particulates may turn out to be an important one that will focus our efforts like the issues of carbon monoxide and nitrogen oxide did in earlier decades.

Our first examination of the UFP issue as raised by the Canadian Broadcasting Corporation has not clearly indicated how serious this issue is.

INDOOR AIR IN ICE FACILITIES

– Understanding the Issues

O.R.F.A. and the Canadian Recreation Facilities Council (CRFC) continue to have ongoing discussions with facility managers who were most affected by the CBC investigation. It would appear that the investigation was suspect in methodology and as such continues to be investigated and carefully reviewed by all involved. The following points should be considered when addressing the CBC investigation or as consideration for any indoor air quality testing program.

- The CBC Reporter who conducted the original tests was not trained as an Industrial Hygienist; training was provided by the supplier of the testing equipment to the reporter; additional follow-up with the reporter has been requested to help in the re-testing of some facilities – the request has so far been declined.
- Ultra Fine Particles are best defined as “matter that makes up smell” – any encounter with odour would suggest elevated levels of particulate matter; the smell of freshly cut grass would significantly increase particulate matter levels on testing equipment.
- To date, there are no known “standards” to collect Ultra Fine Particle samples.
- All recognized governing agencies surrounding air quality have yet to recognize air particulates as a health risk.
- Ontario’s Ministry of Labour continues to investigate the issue.

O.R.F.A. encourages all testing of indoor air quality in arenas to follow a protocol suggested below:

1. Information on the state of any arena air quality which is to be released to the media must be based on tests conducted by a **trained professional**;
2. A **series of indoor tests** should be conducted throughout the facility at different times and locations with all results being posted;
3. **Outside air should be tested** and weather patterns observed as part of the process;
4. **Facility management should be contacted** to advise of the planned testing exercise – the “10-Questions to Ask Your Arena Manager on Air Quality in Their Facility” should be part of the testing protocol;

5. The person, agency or company conducting the test should feel free to **contact the relevant provincial or territorial recreation association** to obtain the most up to date information on facility air quality issues and management indoor air management techniques.

Canadian Recreation Facilities Council

Vision

The Canadian Recreation Facilities Council will be the recognized national leader and advocate for all recreation facility associations and similar organizations.

MISSION

To be the national forum advancing recreation facilities.

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