

TITLE 216 – DEPARTMENT OF HEALTH

CHAPTER 50 – ENVIRONMENTAL HEALTH

SUBCHAPTER 15 – HEALTHY ENVIRONMENT

PART 4 – Air Quality in Ice Arenas

4.1 Authority

These regulations are promulgated pursuant to the authority conferred under R.I. Gen. Laws §§ [23-1-17\(a\)](#) and [23-1-18\(6\)](#), for the purpose of regulating the air quality in ice arenas to protect public health.

4.2 Applicability

The requirements of this Part apply to all owners and operators of ice arenas in which internal combustion engine-powered ice resurfacing machines, internal combustion engine-powered (e.g. gas-fired) heaters and/or other devices which emit carbon monoxide and/or nitrogen dioxide are used.

4.3 Definitions

A. Whenever used in these rules and regulations, the following terms shall be construed as follows:

1. “Department” means the Rhode Island Department of Health.
2. “Director” means the Director of the Rhode Island Department of Health or his/her designee.
3. “Edger” means internal combustion engine-powered equipment used to modify the perimeter of an ice surface.
4. “Ice arena” means any building with a roof and partially or fully enclosed sides which contains an ice rink.
5. “Ice maintenance machine” means an edger or a resurfacing machine.
6. “Operator” means the person designated by the owner as responsible for the day to day operation of the ice arena.
7. “Owner” means the person having legal title to property and/or buildings. For purposes of publicly owned property only, the owner shall be defined to be the chief executive officer of the state or municipal agency which owns, leases or controls the use of the property.
8. “Person” means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, political

subdivision of this State, and other State or political subdivision or agency thereof, and the legal successor, representative, agent or agency of the foregoing.

9. "Resurfacing machine" means any internal combustion engine-powered machine used for modifying the entire ice rink surface.

4.4 Acceptable Indoor Air Quality

The owner/operator of an ice arena must maintain acceptable air quality conditions in the ice rink and in all other areas of the ice arena that are accessible to the public at all times that the ice arena is open to the public. Such conditions are defined as a one-hour average air concentration of not more than thirty (30) parts per million (ppm) of carbon monoxide and a one-hour average air concentration of not more than 0.5 ppm of nitrogen dioxide.

4.5 Maintenance of Air Quality Conditions

- A. The owner/operator of an ice arena shall use the following methods to maintain acceptable air quality conditions:
 1. Mechanical adjustment (tuning) and maintenance of the internal combustion engines of all ice maintenance machines, internal combustion heaters and other devices which emit carbon monoxide and/or nitrogen dioxide, according to the manufacturers' recommendations; and
 2. Proper ventilation of the ice arena; and/or
 3. Another method approved in writing by the Director.

4.6 Measurement of Air Quality Conditions

- A. The owner/operator of an ice arena shall measure air quality conditions in the ice rink according to the specifications in this section.
- B. Air quality conditions shall be measured as the concentration of carbon monoxide and, on and after July 1, 2018, as the concentration of nitrogen dioxide.
- C. Air quality conditions shall be measured at least three times during each week that the arena is open to the public, including at least two weekdays and at least one weekend day.
- D. Measurements shall be taken at a time of maximum frequency of use of the resurfacing machine, twenty (20) minutes after resurfacing is completed.
- E. If an edger is operated in the ice arena, additional air quality measurements shall be taken at least once per week:
 1. Twenty (20) minutes after edging is completed, if the arena building is open to the public when edging occurs; or

2. Before the public reoccupies the building, if the arena building is not open to the public when edging occurs.
- F. Measurements shall be taken at board height, inside the boards, and at the centerline of the ice.
 - G. Carbon monoxide shall be measured using a device that accurately and reliably measures carbon monoxide levels in a range of zero (0) to one hundred (100) ppm in increments of 1 ppm.
 - H. On and after July 1, 2018, nitrogen dioxide shall be measured using a device that accurately and reliably measures nitrogen dioxide in a range of zero (0) to five (5) ppm in increments of 0.1 ppm.
 - I. Measuring devices shall be operated, stored, maintained and calibrated according to the manufacturer's specifications.
 - J. Measurements and information on measuring devices shall be documented and reported as specified in § 4.8 of this Part.

4.7 Failure to Maintain Air Quality

4.7.1 Evacuation and Immediate Notification

Whenever any reading greater than or equal to 85 ppm of carbon monoxide and/or any reading greater than or equal to two (2) ppm of nitrogen dioxide is measured in the ice arena, all persons shall be immediately evacuated from the ice rink surface and adjacent areas. The Director shall be immediately notified by telephone of any such action and the ice arena may not reopen until authorized by the Director.

4.7.2 Corrective Action

- A. Whenever any reading in excess of thirty (30) ppm of carbon monoxide and/or any reading in excess of 0.5 ppm of nitrogen dioxide is measured in the ice arena, the owner or operator shall implement immediate and long-term corrective actions, as specified in this section.
- B. The owner or operator shall immediately increase the ventilation rate in the skating rink area and suspend operation of ice maintenance machines and other internal combustion engine-powered equipment. These actions shall remain in place until follow-up air quality measurements, taken as specified in § 4.7.3 of this Part, demonstrate that acceptable indoor air conditions have been restored.
- C. As soon as reasonably practical, the owner or operator shall identify the cause of the air quality measurement that exceeded the levels specified in § 4.7.2(A) of this Part, and shall take corrective actions to prevent future exceedances. Such long-term corrective actions may include, but are not limited to:
 1. Increasing general ventilation rates and/or installing local ventilation in problem areas which vent to the outside;

2. Increasing the interval between resurfacing operations;
3. Decreasing the length of time that ice maintenance machines, including edgers, are operated;
4. Warming up the resurfacing machine outside the ice arena;
5. Adjusting (tuning up) or repairing ice maintenance machines and other internal combustion engine-powered equipment and, subsequently, adjusting, maintaining and operating that equipment according to the manufacturer's instructions;
6. Replacing ice maintenance machines with equipment having no or lower emissions;
7. Installing a vertical exhaust pipe that vents above the highest point of the resurfacing machine; and
8. Installing a catalytic convertor, oxygen sensor, or another device designed to reduce emissions from ice maintenance machines.

4.7.3 Follow-up Action Required

- A. Whenever the conditions described in § 4.7.2(A) of this Part occur, the owner/operator of an ice arena must immediately begin measuring air quality conditions according to the following schedule:
 1. Measurements must be taken at intervals of not more than twenty (20) minutes until carbon monoxide measurements are lower than thirty (30) ppm and nitrogen dioxide measurements are lower than 0.5 ppm;
 2. Measurements must be taken twenty (20) minutes after the next five (5) uses of ice maintenance equipment; and
 3. Measurements must be taken at least once per day for the subsequent three (3) days of arena operation.
- B. The Director shall be immediately notified by telephone of:
 1. Any measurement in the ice arena that is greater than or equal to eighty-five (85) ppm of carbon monoxide and/or two (2) ppm of nitrogen dioxide; and
 2. Any time that carbon monoxide levels exceed thirty (30) ppm and/or nitrogen dioxide levels exceed 0.5 ppm for more than one hour.
- C. Whenever the conditions described in § 4.7.2(A) of this Part occur, the owner/operator must submit a written report to the Director within five (5) working days that includes the information specified in § 4.8.3 of this Part.

4.8 Recordkeeping and Reporting

4.8.1 Equipment Records

- A. The owner/operator of an ice arena shall maintain the following records at the arena and shall make those records available to the Department upon request:
1. The following information for each ice maintenance machine and any other equipment powered by an internal combustion engine that is used in the ice arena:
 - a. Name of equipment manufacturer;
 - b. Model identifier and age of equipment;
 - c. Fuel used to operate equipment;
 - d. The date that each equipment readjustment (tuning) and other service occurs and the nature of that service;
 - e. The manufacturer, type and date of installation of any catalytic convertor, oxygen sensor, or other device designed to reduce emissions;
 - f. The date that a vertical exhaust pipe or other modification of the resurfacing machine occurs: and
 - g. The name, company and signature of the person who performs the functions listed in §§ 4.8.1(A)(1)(d) through (f) of this Part and documentation that the person performing that function has received formal and/or on-the-job training relevant to the repair and maintenance of the equipment serviced.
 2. The following information for each device used to measure air quality conditions in the ice arena:
 - a. Name of equipment manufacturer;
 - b. Model identifier and documentation that shows that the device meets the specifications in § 4.6(G) of this Part for carbon monoxide measurement devices or § 4.6(H) of this Part for nitrogen dioxide measuring devices;
 - c. Calibration records, which shall include, at a minimum, the following data:
 - (1) Name of person performing the calibration;
 - (2) Date of calibration;
 - (3) Actual reading observed;

- (4) Concentration of calibration gas used; and
 - (5) Any problems that could invalidate the calibration.
- d. Records of any additional service to measuring devices, including the date and nature of service.

4.8.2 Air Quality Measurement Records and Reports

- A. The owner/operator of an ice arena shall record measurements of air quality conditions, as required in §§ 4.6 and 4.7.5 of this Part, on Form ICE-1, which is available on the Department's website, or its equivalent. The owner/operator shall maintain those records at the ice arena for a minimum of three years and shall submit a copy of the Form ICE-1 data for each month to the Director not later than the fifth day of the following month.
- B. All information contained on Form ICE-1 (or equivalent) shall be made available, on reasonable request, to any person with an interest in the operation of the ice arena including, but not limited to, headmasters/school superintendents, league/association officials, referees and coaches. The owner/operator of an ice arena must post copies of Form ICE-1 (or equivalent) in the ice arena foyer or other location that is readily accessible to both ice arena employees and the general public. Alternatively, the owner/operator of an ice arena may post a notice indicating where such information is available for review.

4.8.3 Failure to Maintain Air Quality Condition Reports

- A. Whenever the conditions described in § 4.7.2(A) of this Part occur, a written report must be submitted to the Director within five (5) working days that includes:
1. An explanation of why the air quality control methods in place at the arena failed to maintain acceptable air quality conditions;
 2. Documentation of evacuation, notification, corrective and follow-up actions that were taken; and
 3. A plan that identifies actions that have been or will be implemented to prevent a recurrence of unacceptable air quality conditions, including a timetable for implementing those actions.

4.9 Communication and Notification

4.9.1 Telephone Notifications

All telephone notifications to the Director that are required in § 4.7 of this Part should be made by calling 401-222-5960, 24 hours a day.

4.9.2 Written Reports

All written reports to the Director that are required in this Part should be sent to:

Rhode Island Department of Health
Healthy Homes and Environment
Three Capitol Hill, Room 206
Providence, RI 02908-5097

4.10 Inspection and Enforcement

4.10.1 Inspections

The Director, or his or her designee, may inspect an ice arena at a reasonable time, without prior notice, to review the implementation of this Part or to respond to a complaint of the existence of air quality conditions that are not in compliance with this Part.

4.10.2 Compliance and Enforcement

Violations of this Part will be handled by the Director in accordance with procedures contained in R.I. Gen. Laws §§ [23-1-20](#) through [23-1-25](#).

4.11 Practices and Procedures

4.11.1 Rules Governing Practices and Procedures

All hearings and reviews required under these regulations shall be held in accordance with the provisions of the rules and regulations regarding Practices and Procedures Before the Rhode Island Department of Health (Part 10-05-4 of this Title).