CITY OF PHILADELPHIA
DEPARTMENT OF PUBLIC HEALTH
AIR POLLUTION CONTROL BOARD

AIR MANAGEMENT REGULATION XI

CONTROL OF EMISSIONS FROM INCINERATORS

Approved By:

Air Pollution Control Board.....March 12, 1974

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(CONTAINING AMENDMENTS AND REVISIONS THROUGH JANUARY 29, 2026)

AIR MANAGEMENT REGULATION XI

CONTROL OF EMISSIONS FROM INCINERATORS

SECTION I. DEFINITIONS

Batch Incineration - A batch incineration is one in which refuse is charged, burned and residue removed in sequence prior to recharging of any additional refuse to the incinerator.

Continuous Incineration - A continuous incineration operation is one in which the charging of refuse and burning shall occur simultaneously and continuously.

Continuous Monitoring - The utilization of commercially available instruments to continuously measure a specified combustion and/or emission parameter and provide a continuous indication of that measurement.

Continuous Recording - The utilization of a device such as a strip chart recorder, meter, circular chart recorder, etc. to receive a signal from a continuous monitoring instrument and provide a continuous record of that signal relative to a given measurement.

Crematory Furnaces - Devices specially designed and intended solely for the destruction of Type 4 wastes.

Department - The City of Philadelphia's Department of Public Health Division of Air Management Services or any duly authorized representative thereof.

Existing Incinerator – Incinerator that has an installation permit or operating permit before January 29, 2026.

Flyash - Particulate matter capable of being gasborne or airborne and consisting essentially of fused ash and/or burned or unburned material.

Garbage - Animal and vegetable material or direct derivatives of animal or vegetable material waste matter.

Health Care Facility - A facility or location where medical, dental, surgical or nursing attention or treatment is provided to humans or animals.

Heat Recovery System - A system consisting of an incinerator which can combust any of the standard waste classifications (Types 0 through 6 and RDF) and a heat recovery section either as an integral part of the incinerator or separate to it such that heat from combustion of waste is recovered and utilized.

Incinerator - All devices intended or used for the destruction of rubbish, garbage, debris, scrap, human and animal remains, other refuse, or other combustible materials by means of burning of extraneous materials.

Infectious Waste -

a. Equipment, instruments, utensils and other objects, not intended for re-use, which are capable of transmitting infection from areas or rooms where humans or animals with suspected or diagnosed communicable disease are housed or treated.

b. Human or animal specimens and disposable objects derived from or used in surgical or other medical procedures which are capable of transmitting infection.

c. Laboratory wastes which may harbor or transmit infection.

Laboratory - Any place, establishment or institution organized and operated for the performance of all or any microbiological, biochemical, hematological, microscopial, immunological, parasitological tests or other tests, examinations or evaluations and those facilities that work with pathogens, animals or use various biotechnologies which generate infectious waste.

Multiple Chambers - Two or more areas or sections in an incinerator of which one is for the primary combustion of refuse and another for secondary combustion of materials from the primary combustion chamber.

New Incinerator - Any incinerator installed after January 29, 2026, or an existing Incinerator operating without a permit.

Odor - Smells or aromas which are unpleasant to persons, or which tend to lessen human food and water intake, interfere with sleep, upset appetite, produce irritation of the upper respiratory tract, or create symptoms of nausea, or which by their inherent chemical or physical nature, or method of processing are or may be detrimental or dangerous to health. Odors and smells are used herein interchangeably.

Opacity - The property of a substance which renders it partially or wholly obstructive to the transmission of visible light expressed as a percentage to which the light is obstructed.

Particulate Matter - Any material, except uncombined water, that exists in a finely divided form as a liquid or solid at standard conditions.

PADEP – The Pennsylvania Department of Environmental Protection.
Person - Any individual, natural person, syndicate, association, partnership, firm, corporation, institution, agency, authority, department, bureau, or instrumentality of federal, state or local government or other entity recognized by law as a subject of rights and duties.

Qualified Operator - Person who has satisfactorily completed a training program provided by the manufacturer and/or engineering firm responsible for the installation of the incinerator or any other appropriate training program approved by the Department.

Refuse Derived Fuel (RDF) - A relatively homogeneous mix of municipal refuse which has been refined by removing various noncombustible components resulting in a more uniform combustible material.

Secondary Air - Air introduced within an incinerator or heat recovery system after primary combustion in order to gain additional combustion.

Smoke Detector - A device, designed to detect particulate emissions from a stack, which is not certifiable as an opacity monitor and which does not produce output equivalent to a certified observer.

Standard Conditions - A gas temperature of 60 degrees Fahrenheit and a gas pressure of 14.7 pounds per square inch absolute.

Standard Cubic Foot - A cubic foot of gas at standard conditions.

Type 0 Waste - A mixture of highly combustible waste such as paper, cartons, or scrap wood containing approximately ten (10) percent or less moisture, and five (5) percent or less incombustible solids. The heating value of Type 0 Waste is approximately 8500 BTU per pound of waste as fired.

Type 1 Waste - A mixture of combustible waste such as paper, cartons, or scrap wood containing approximately ten (10) to twenty-five (25) percent moisture, and ten (10) percent or less incombustible solids. The heating values of Type 1 Waste is approximately 6500 BTU per pound of waste as fired.

Type 2 Waste - A mixture of approximately equal amounts, by weight, of rubbish and garbage containing approximately fifty (50) percent or less moisture and approximately seven (7) percent or less incombustible solids. The heating value of Type 2 Waste is approximately 4300 BTU per pound waste as fired.

Type 3 Waste - Garbage wastes containing approximately seventy (70) percent or less moisture and approximately five (5) percent or less incombustible solids. The heating value of Type 3 Waste is approximately 2500 BTU per pound waste as fired.

Type 4 Waste - Human and animal remains consisting of carcasses, organs, other body parts and solid organic wastes containing approximately eighty-five (85) percent or less moisture and five (5) percent or less of incombustible solids. The heating value of Type 4 Waste is approximately 1000 BTU per pound waste as fired.

Type 5 Waste - Liquid or semi-liquid by-product combustible waste such as tar, paint, solvents and other similar materials from industrial operations.

Type 6 Waste - Solid by-product combustible waste such as rubber, plastic, wood, and other materials from industrial operations. The heating value of Type 6 Waste is greater than 9500 BTU per pound of waste as fired.

U.S. EPA - United States Environmental Protection Agency.

SECTION II. GENERAL PROVISIONS

A. No person shall permit, cause, suffer or allow the installation of any incinerator on or after the original date of adoption of this Regulation which has a burning rate of less than 10,000 pounds per hour and is intended to, or does incinerate Types 0, 1 or 2 wastes or refuse derived fuel except:

1. As a replacement of similar capacity to an existing, operating and licensed incinerator at the same location.

2. As a heat recovery system with a burning rate of 1000 pounds per hour or more, recovering and utilizing at least 40% of the gross heat input on a daily basis, including that from auxiliary burners.

3. As a heat recovery system at a hospital, health care facility or laboratory with a burning rate of 500 pounds per hour or more of a mixture of Type 0, 1 or 2 wastes and the majority of the facility's infectious wastes recovering and utilizing at least 40% of the gross heat input on a daily basis, including that from auxiliary burners.

B. Incinerator and/or heat recovery systems which incinerate Types 3,4, 5, or 6 wastes or infectious wastes (at a hospital, health care facility or laboratory) are allowed to be installed with no restriction as to minimum size.

C. All new incinerators and/or heat recovery systems shall be equipped with multiple chambers or its equivalent, auxiliary heat source(s), suitable controls and instrumentation as required by the Department and shall meet requirements of other permitting authorities including, but not limited to, the PA. DER and the U.S. EPA, where applicable.

D. All new incinerators shall meet the Best Available Technology (BAT) Criteria of the PADEP where applicable, including BAT Criteria for Municipal Waste Incineration Resource Recovery Facilities and Hospital/Infectious Waste Incinerators.

SECTION III. EMISSION LIMITATIONS, MONITORING, & RECORDKEEPING

A. Particulate Matter Emissions

1. No person shall permit, cause, suffer or allow the discharge into the atmosphere of particulate matter from any incinerator installed prior to May 4, 1974, in excess of 0.10 grains per standard cubic foot of flue gas on a dry basis adjusted to 7% oxygen (O_2) as measured by stack testing methods approved by the Department.

2. No person shall permit, cause, suffer, or allow the discharge into the atmosphere of particulate matter from any incinerator installed between May 4, 1974 and September 25, 1987 in excess of 0.08 grains per standard cubic foot of flue gas on a dry basis adjusted to 7% oxygen (O_2) as measured by stack testing methods approved by the Department.

3. No person shall permit, cause, suffer, or allow the discharge into the atmosphere of particulate matter from any incinerator and/or heat recovery system installed after September 25, 1987 burning any type waste, in excess of 0.03 grains per standard cubic foot of flue gas on a dry basis adjusted to 7% oxygen (O_2) as measured by stack testing methods approved by the Department.

B. Visible Emissions

1. For existing incinerators or heat recovery systems, visible emissions shall not exceed, except for uncombined water, for a period of more than thirty (30) consecutive seconds in any one hour or an aggregate of more than three (3) minutes in any calendar day twenty (20) percent opacity, or for any period for which is equal or greater than (60) % opacity.

2. For new incinerators or heat recovery systems, visible emissions shall not exceed, except uncombined water, for a period of more than thirty (30) consecutive seconds in any one hour or an aggregate of more than three (3) minutes in any calendar day which is equal to or greater than five (5) percent opacity.

3. No person shall permit, cause, suffer or allow the discharge and/or fallout from any incinerator or heat recovery system of any visible flyash.

4. The Department may make observations to determine compliance with the above provisions without direct reference standards.

C. Toxic Air Contaminants

The owner and/or operator of any incinerator or heat recovery system shall insure that potential and/or actual emissions of toxic air contaminants comply with Air Management

Regulation VI "Control of Emissions of Toxic Air Contaminants," any amendments thereto, and the Technical Guidelines adopted thereunder.

D. Odor Emissions

No person shall permit, cause, suffer, or allow an emission of odor from an incinerator or heat recovery system beyond the perimeter of the facility. This prohibition applies to the incinerator or heat recovery unit and the storage and handling of refuse and solid residues at the facility.

E. Carbon Monoxide (CO) Emissions

The owner and/or operator of any incinerator or heat recovery system installed after September 25, 1987 shall install appropriate controls so that carbon monoxide concentrations in the combustion gases, as measured at a point upstream of the control devices, shall not exceed: 100 ppm v as a four-day running average and 400 ppm v as an 8-hour average. These concentrations are to be corrected to 7% oxygen on a dry basis.

F. Any incinerator or heat recovery system installed after September 25, 1987, shall have a combustion efficiency (CE) of at least 99.9 percent as a four-day running average, computed as follows:

$$CE = \frac{Cco2}{Cco2 + Cco} \times 100$$

Cco2 = Concentration of carbon dioxide
Cco = Concentration of carbon monoxide

SECTION IV. DESIGN

A. All new incinerators and heat recovery systems burning Types 0, 1, 2, 3, 4, 5 or 6 waste or infectious wastes or refuse derived fuel, with the exception of crematory furnaces incinerating only Type 4 wastes, must be designed to provide:

1. An automatically controlled auxiliary burner(s) capable of heating and maintaining the combustion gases, after the introduction of secondary air, to a temperature of not less than 1800 degrees Fahrenheit for at least one second and at an oxygen content greater than 7% by volume measured on a dry basis,

2. Continuous monitoring and recording of various flue gas emissions including, but not limited to, oxygen (O2), opacity, carbon monoxide, carbon dioxide and temperature (measured at a location to demonstrate compliance with Section IV A 1.); and

3. Appropriate access in the stack and other flue areas to allow for sampling to determine compliance with these Regulations.

4. Crematory furnaces incinerating only Type 4 wastes may comply with Section IV(A) (1) and (2) by continuously monitoring and recording temperature and by substituting a continuous smoke detector and recorder in lieu of an opacity monitor. Operators may periodically monitor the oxygen content of the flue gas according to a schedule approved by the Department in lieu of operating continuous oxygen, carbon monoxide and carbon dioxide monitors.

B. Crematory furnaces incinerating only Type 4 wastes must be designed to provide:

1. An automatically controlled auxiliary burner(s) capable of heating and maintaining the combustion gases, after the introduction of secondary air, to a temperature of not less than 1600 degrees Fahrenheit for at least one second and at an oxygen content greater than 7% by volume measured on a dry basis;

2. Continuous monitoring and recording of various flue gas emissions including, but not limited to, oxygen (O2), opacity, carbon monoxide, carbon dioxide and temperature (measured at a location to demonstrate compliance with Section IV B 1.); and

3. Appropriate access in the stack and other flue areas to allow for sampling to determine compliance with these Regulations.

4. Crematory furnaces incinerating only Type 4 wastes may comply with Section IV(B) (1) and (2) by continuously monitoring and recording temperature and by substituting a continuous smoke detector and recorder in lieu of an opacity monitor. Operators may periodically monitor the oxygen content of the flue gas according to a schedule approved by the Department in lieu of operating continuous oxygen, carbon monoxide and carbon dioxide monitors.

SECTION V. OPERATION & MAINTENANCE

A. No person shall permit, cause, suffer or allow the operation of an existing incinerator and/or heat recovery system unless:

1. It has been properly installed and well maintained as per equipment manufacturing instructions and specifications;

2. The burner system is fueled by natural gas, propane, No. 2 fuel oil, or lighter fuels;

3. All structural components, control equipment, monitoring and recording equipment are properly installed and well maintained;

4. All control, monitoring and recording equipment is in full operation;

5. It is incinerating only those wastes and not more than the maximum quantity of waste for which it is permitted;

6. The owner has supplied a list of all potential operators of the unit and their qualifications including training and certification

7. It is being operated by a person properly qualified and who is present at all times during which the unit is being operated;

8. A current operating permit has been obtained; and

9. Combustion gases, after the introduction of secondary air, are maintained at a temperature of not less than 1400 degrees Fahrenheit for at least one half (0.5) second.

B. In addition to the requirements of Section V.A., no person shall permit, cause, suffer, or allow the operation of any incinerator or heat recovery system burning Types 0, 1, 2, 3, 5 or 6 wastes or infectious wastes or refuse derived fuel unless combustion gases after the introduction of secondary air, are maintained at a temperature of not less than 1800 degrees Fahrenheit for at least one second, with the exception of crematory furnaces incinerating only Type 4 wastes which must maintain a temperature of not less than 1600 degrees Fahrenheit in the secondary chamber for at least one second prior to the start of cremation.

C. All existing and new incinerators, control systems, monitors and recorders shall receive a maintenance inspection and review at least quarterly with results available for inspection by the Department upon request.

D. Allowable and disallowable materials charged in crematory furnaces.

1. For crematory furnaces, allowable materials to be charged in the unit shall include:
    a. Remains of the deceased human or animal, as applicable;
    b. Cremation containers made of cardboard, medium density fiberboard, plywood, or pressboard;
    c. Wooden caskets designed and marketed for cremation;
    d. Plastic film containing no polyvinyl chloride (PVC), but on a case-by-case basis approved by the Department, may include plastic films containing PVC where necessary to protect the health and safety of the operator; and
    e. Bedding and personal effects.

2. For crematory furnaces, the following materials not allowed to be charged in the unit include:
    a. Medical or infectious waste;
    b. Fiberglass caskets or coffins;
    c. Metal caskets or coffins;
    d. Lacquer/varnish/shellac-covered caskets or coffins;

e. Medical devices (pacemakers, defibrillators, etc.);
f. Potentially hazardous remedial devices (e.g. radioactive implants, etc.) that must be removed from the body prior to cremation; and
g. Any device that can potentially harm or cause issues to the crematory unit's operation.

SECTION VI. CONSTRUCTION AND OPERATING PERMITS

A. Construction Permits for New Incinerators

For new incinerators or crematories, a Plan Approval shall be obtained prior to the installation of any incinerator and/or heat recovery system. Application for this Plan Approval shall be made on forms provided by the Department. Detailed plans and specifications shall be included with the application form and shall include, but not be limited to the following:

1. The estimated daily amount, type and composition of waste to be incinerated, the basis for this estimate, and the design capacity;

2. Engineering drawings of the incinerator, and/or heat recovery system, the stack, the charging chute, and air pollution control equipment, if any. The locations of overfire and underfire air inlets shall be shown in the drawings;

3. The location and height of the building housing the incinerator and/or heat recovery system and immediately surrounding buildings;

4. The location and details of the combustion air inlets to the incinerator and/or heat recovery system room or area, the burners and other incinerator equipment;

5. The location of and details of all air pollution control equipment;

6. The list of operating and maintenance procedures recommended by the manufacturer of the incinerator and/or heat recovery system, including a statement indicating batch or continuous incinerator operation; and

7. A completed risk assessment pursuant to Air Management Regulation VI.

B. Installation Permits for Modification of Existing Sources.

For existing incinerators or heat recovery systems, a modification or an alteration may be requested through an installation permit application or operating permit modification. Modifications or alternations that result in an increase of air toxic air emissions shall be approved in accordance with Air Management Regulation VI, any amendments thereto, and the Technical Guidance Document to AMR VI.

C. Operating Permits for New and Existing Incinerators.

1. All existing incinerators shall have an operating permit.

2. For new incinerators, the application for an operating permit to operate an incinerator and/or heat recovery system shall be filed within 60 days after conformance by the Department.

3. The operating permit application shall detail the specific composition of the waste, and any future changes in waste composition shall require submittal of written notice to, and approval from, the Department prior to its combustion.

4. A letter shall be submitted along with the operating permit application certifying that a trained and qualified person will be present at all times when the incinerator and/or heat recovery system is in use to ensure proper operation.

5. The Department shall approve the operating permit application only after receipt of an acceptable stack test report for the installation verifying emissions of all pollutants of concern are within acceptable limits and an adequate period of observation to ensure appropriate operating and maintenance parameters.

   a. For all incinerators, an acceptable stack test shall include, but not be limited to, the following: particulate matter, visible emissions, toxic air contaminants as defined in Air Management Regulation VI, and carbon monoxide.

   b. For all existing and new incinerators, after the initial stack test, subsequent testing shall be every five (5) calendar years for PM and opacity and other pollutants requested by the Department to verify compliance.

   c. All test methods for compliance determination shall be conducted in accordance with U.S. EPA Reference Methods, PADEP Stack Testing Manual, and other methods approved by the Department.

   d. Prior to conducting the stack test, a stack test protocol must be submitted to, and approved by, the Department.

SECTION VII. CIRCUMVENTION

No person shall build, erect, install or use any article, machine, equipment or other contrivance, the sole purpose of which is to dilute or conceal an emission without resulting in a reduction in the total release of air contaminants to the atmosphere.

SECTION VIII. SEVERABILITY

The provisions of these Regulations are severable and if any provision, sentence, clause, section or part thereof shall be held illegal, invalid, unconstitutional or inapplicable to any person or circumstances, such illegality, invalidity, unconstitutionality or inapplicability shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of the ordinance or their application to him or to other persons and circumstances. It is hereby declared to be the legislative intent that these Regulations would have been adopted if such illegal, invalid or unconstitutional provision, sentence, clause or part had not been included therein, and if the person or circumstances to which the ordinance or any part thereof is inapplicable had not specifically been exempted therefrom.

SECTION IX. EFFECTIVE DATE

Except as otherwise provided, this Regulation shall become effective upon adoption.