Sec. 22a-174-38. Municipal waste combustors

(a) **Definitions.** For purposes of this section:

(1) "Calendar quarter" means a consecutive three-month period (nonoverlapping) beginning on January 1, April 1, July 1 or October 1.

(2) "Calendar year" means the twelve consecutive month period starting on January 1 and ending on December 31.

(3) "Chief operator" means an individual who is in direct charge of the operation of a municipal waste combustor plant and who is responsible for overall on-site supervision, technical direction, management and performance of the plant.

(4) "Continuous burning" means the continuous, semi-continuous or batch feeding of municipal solid waste for purposes of waste disposal, energy production or providing heat to the combustion system in preparation for waste disposal or energy production. Continuous burning does not include the use of municipal solid waste solely to provide thermal protection of the grate or hearth during the startup period when municipal solid waste is not being fed to the grate.

(5) "Continuous emission monitoring system" or "CEM system" means a monitoring system for continuously measuring the emissions of any pollutant from a MWC unit.

(6) "Dioxin/furan" means tetra-chlorinated dibenzo-p-dioxins and dibenzofurans through octa- chlorinated dibenzo-p-dioxins and dibenzofurans.

(7) "Dscf/mmBTU" means dry cubic feet at standard conditions per million British thermal unit.

(8) "Eight-hour block average" or "8-hour block average" means the arithmetic mean of all hourly emission concentrations or parameter levels when a municipal waste combustor unit is operating and combusting municipal solid waste measured over any of the following three 8-hour periods of time: midnight to 8 a.m.; 8 a.m. to 4 p.m.; or 4 p.m. to midnight.

(9) "F-factor," "fc" or "fd" means a ratio of combustion gas volume to heat input either unit-specific or as defined in 40 CFR 60, Appendix A, Method 19.

(10) "Four-hour block average" or "4-hour block average" means the arithmetic mean of all hourly emission concentrations or parameter levels when a municipal waste combustor unit is operating and combusting municipal solid waste measured over any of the following six 4-hour periods of time: midnight to 4 a.m.; 4 a.m. to 8 a.m.; 8 a.m. to noon; noon to 4 p.m.; 4 p.m. to 8 p.m.; or 8 p.m. to midnight.

(11) "Historical actual twenty-four hour daily NO_x average" means one or more calendar years of CEM data from no earlier than 1994 or another period of data approved by the commissioner as representative of NO_x emissions.

(12) "Malfunction" means any sudden, infrequent and not reasonably preventable failure of air pollution control equipment, process equipment or a process to operate in a normal or usual manner. A failure that is caused in part by poor maintenance or negligent or careless operation shall not be considered a malfunction.

(13) "Mass burn waterwall combustor" means a field-erected combustor that combusts primarily unprocessed municipal solid waste (i.e., municipal solid waste that is not processed-municipal solid waste) in a waterwall furnace.

(14) "Maximum demonstrated municipal waste combustor unit load" means the highest 4-hour block average municipal waste combustor unit load achieved during four consecutive

hours of operation that corresponds to a test run during the most recent dioxin/furan emissions performance test that demonstrates compliance with the applicable limit for dioxin/furan specified in subsection (c) of this section.

(15) "Maximum demonstrated particulate matter control device temperature" means the highest 4-hour block average flue gas temperature measured at the particulate matter control device inlet during four consecutive hours of operation that corresponds to a test run during the most recent dioxin/furan emissions performance test that demonstrates compliance with the applicable limit for dioxin/furan specified in subsection (c) of this section.

(16) "mg/dscm" means milligrams of air pollutant per dry standard cubic meter.

(17) "Modification" means "modification or modified municipal waste combustor unit" as defined in 40 CFR 60.51b.

(18) "Municipal solid waste" means municipal solid waste as defined in section 22a-207 of the Connecticut General Statutes.

(19) "Municipal waste combustor," "municipal waste combustor unit" or "MWC" means any part or activity of any stationary source which part or activity emits or has the potential to emit any regulated air pollutant or any hazardous air pollutant, exclusive of associated air pollution control equipment, that combusts municipal solid waste, inclusive of those emissions units constructed prior to January 1, 2007 combusting a single-item waste stream of tires. Combustors that combust landfill gases collected by landfill gas collection systems are not municipal waste combustors.

(20) "Municipal waste combustor plant" or "plant" means any premises at which one or more municipal waste combustor units are situated.

(21) "Municipal waste combustor unit load" means the rate at which steam is produced at a municipal waste combustor (measured in lbs/hr or kg/hr).

(22) "ng/dscm" means nanograms of air pollutant per dry standard cubic meter.

(23) "NO_x Emissions Reductions Credit" or "ERC" means an air pollutant reduction created in the nitrogen oxides emissions trading program described by this section.

(24) Reserved.

(25) "Ozone season" means the period of any calendar year beginning on May 1 and ending on September 30.

(26) "Premises" means the grouping of all stationary sources at any one location and owned by or under the control of the same person or persons.

(27) "Processed-municipal solid waste" means a type of municipal solid waste produced by sorting municipal solid waste by size and/or altering the size of municipal solid waste through mechanical means.

(28) "Processed-municipal solid waste combustor" means a steam-generating MWC that burns processed-municipal solid waste in a semisuspension firing mode using air-fed distributors.

(29) "Reciprocating grate waste tire fired incinerator/boiler" means a combustor that burns tires as its principal fuel.

(30) "Scf/mmBTU" means cubic feet at standard conditions per million British thermal unit.

(31) "Shift operator" means an individual who is in direct charge of the operation of a shift of a municipal waste combustor plant and who is responsible for on-site supervision,

technical direction, management and overall performance of the plant during a shift.

(32) "Shutdown period" means the period of time commencing when a municipal waste combustor operator discontinues the feed of municipal solid waste to the combustor in order to cease operation.

(33) "Six-minute arithmetic average" or "6-minute arithmetic average" means the arithmetic mean calculated from thirty-six (36) or more data points equally spaced over each 6-minute period.

(34) "Standard conditions" means a temperature of 20 degrees centigrade and a pressure of 101.3 kilopascals.

(35) "Startup period" means that period of time commencing when a municipal waste combustor begins the continuous burning of municipal solid waste, exclusive of any warmup period when a municipal waste combustor is combusting fossil fuel or other nonmunicipal solid waste fuel, and no municipal solid waste is being fed to the combustor.

(36) "Total mass" or "total mass dioxin/furan" means the total mass of tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans, as determined using EPA Reference Method 23 and the procedures specified under subsection (i)(4) of this section.

(37) "Twenty-four hour daily average" means the arithmetic mean of all hourly emission concentrations as required by this section when a unit is operating and combusting municipal solid waste measured over a 24-hour period between midnight and the following midnight.

(38) "Twenty-four hour daily geometric average" means the geometric mean of hourly emission concentrations as required by this section when a unit is operating and combusting municipal solid waste measured over a 24-hour period between midnight and the following midnight. The geometric mean shall be calculated using the following equation:

$$G = e^{\left[\frac{1}{n}\sum_{j=1}^{n}\left[\ln\left(Aj\right)\right]\right]}$$

where:

G = daily geometric average pollutant concentration, corrected to 7% O_2or equivalent percent CO_2;

A_j= arithmetic average pollutant concentration, for hour j, corrected to 7% O_2or equivalent percent CO_2;

n = total number of hourly averages for which pollutant concentrations are available within the 24 hour midnight to midnight daily period;

ln = the natural log function; and

e = the natural logarithmic base (2.718).

(39) "Waterwall furnace" means a combustion unit having energy (heat) recovery in the furnace (i.e., radiant heat transfer section) of the combustor.

(b) **Applicability.**

(1) This section shall apply to the owner or operator of any municipal waste combustor except for a MWC unit that meets the conditions of either subparagraph (A) or (B) of this

subdivision:

(A) The unit is subject to 40 CFR 60 Subpart Eb and the owner has obtained for that unit a permit issued under section 22a-174-3a of the Regulations of Connecticut State Agencies, which permit contains emission limits at least as stringent as those stated in subsection (c) of this section for sulfur oxides and mercury; or

(B) The unit is subject to 40 CFR 60 Subpart AAAA and the owner has obtained for that unit a permit issued under section 22a-174-3a of the Regulations of Connecticut State Agencies, which permit contains emission limits at least as stringent as those stated in subsection (c) of this section for sulfur oxides and mercury.

(2) A physical or operational change including installation of control equipment made to a municipal waste combustor primarily to comply with any emission standard required by permit, order or regulation is not considered in determining whether the unit is a modified or reconstructed facility under this section.

(3) The owner or operator of any municipal waste combustor required to have a permit under section 3005 of the Solid Waste Disposal Act (42 U.S.C.A. section 6925) is not subject to this section for the operation of such unit.

(4) The owner or operator of any recycling facility as defined in section 22a-207 of the general statues, including a primary or secondary smelter, that combusts waste for the primary purpose of recovering metals is not subject to this section for the operation of such unit.

(5) The owner or operator of a cement kiln firing municipal solid waste is not subject to this section for the operation of such unit.

(6) The owner or operator of a municipal waste combustor unit to which this section applies shall not be subject to section 22a-174-22 of the Regulations of Connecticut State Agencies for such unit.

(c) **Emission limits.**

(1) No owner or operator of a municipal waste combustor unit subject to this section shall cause or allow the emission from such unit of any air pollutant in excess of the applicable emission limit identified in Table 38-1 of this subdivision.

Table 38-1. Air Pollutant Emission Limits.

Air pollutant	**Emission limit**
Particulate matter	25 mg/dscm
Cadmium	0.035 mg/dscm
Lead	0.400 mg/dscm
Mercury	0.028 mg/dscm, or 85% reduction by weight measured as required by subsection (c)(7) of this section
Sulfur dioxide — Reciprocating grate waste tire fired incinerator/boilers	51 parts per million by volume (ppmvd), or 75% reduction by weight or volume measured as required by subsection (c)(7) of this section

Sulfur dioxide — Mass burn waterwall combustors for which construction commenced after December 20, 1989	29 parts per million by volume (ppmvd), or 80% reduction by weight or volume measured as required by subsection (c)(7) of this section
Sulfur dioxide — All other MWCs	29 parts per million by volume (ppmvd), or 75% reduction by weight or volume measured as required by subsection (c)(7) of this section
Hydrogen chloride	29 parts per million by volume (ppmvd), or 95% reduction by weight or volume measured as required by subsection (c)(7) of this section
Hydrogen chloride — Mass burn waterwall combustors for which construction commenced after December 20, 1989	25 parts per million by volume (ppmvd), or 95% reduction by weight or volume measured as required by subsection (c)(7) of this section
Dioxin/furan	30 ng/dscm total mass
Opacity	10%

(2) Reserved.

(3) Continuous compliance with the particulate matter, cadmium, lead, mercury, hydrogen chloride and/or dioxin/furan emission limits shall be determined based on an initial performance test, annual performance test or other appropriate performance test, as determined in writing by the commissioner, unless otherwise allowed by this section. Such tests shall be performed as required by subsection (i) of this section.

(4) Continuous compliance with the sulfur dioxide emission limits contained herein shall be based on a 24-hour daily geometric average of the hourly arithmetic average emission concentrations using CEM system outlet data if compliance is based on an emission concentration, or CEM system inlet and outlet data if compliance is based on a percent reduction.

(5) Continuous compliance with the opacity emission limit contained herein shall be based on a six-minute arithmetic average.

(6) For an air pollutant for which this subsection provides for an emission limit measured either as a concentration or as a percentage reduction by weight or volume, the less stringent emission limit shall prevail.

(7) For an air pollutant for which this subsection provides for an emission limit measured either as a percent reduction by weight or a percent reduction by volume, compliance shall be determined by measuring the concentration of air pollutant at the outlet of the air pollution control device that discharges directly to the stack, subtracting it from the concentration at the inlet of the air pollution control device that receives exhaust gases directly from the combustion chamber, dividing the difference by the concentration of air pollutant at the inlet to the air pollution control device that receives exhaust gases directly from the combustion chamber and then multiplying that result by a factor of one-hundred

(100).

(8) No owner or operator of a municipal waste combustor shall cause or allow the emission of nitrogen oxides (NO_x) in excess of the applicable emission limit as follows:

(A) Prior to the date specified in subparagraph (B) of this subdivision, in excess of the applicable emission limit listed in Table 38-2 of this subdivision; and

(B) Commencing twelve (12) months after the effective date of this subparagraph, in excess of the applicable emission limit listed in Table 38-2A of this subdivision.

Table 38-2. Nitrogen Oxides Emission Limits.

Municipal waste combustor technology	**Nitrogen oxides emission limit, measured in parts per million volume, corrected to seven percent oxygen, dry basis, or equivalent percentage carbon dioxide as specified in subdivision (12) of this subsection**
Mass burn refractory combustor	177
Mass burn waterwall combustor for which construction commenced on or before December 31, 1985	200
Mass burn waterwall combustor for which construction commenced after December 31, 1985	177
Processed-municipal solid waste combustor	146
Reciprocating grate waste tire fired incinerator/boiler	79

Table 38-2A. Additional Nitrogen Oxides Emission Limits.

Municipal waste combustor technology	**Nitrogen oxides emission limit, measured in parts per million volume, corrected to seven percent oxygen, dry basis, or equivalent percentage carbon dioxide as specified in subdivision (12) of this subsection**
Mass burn refractory combustor	177
Mass burn waterwall combustor	150
Processed-municipal solid waste combustor	146
Reciprocating grate waste tire fired incinerator/boiler	79

(9) Continuous compliance with the nitrogen oxides emission limits contained herein shall be based on a 24-hour daily average.

(10) No owner or operator of a municipal waste combustor unit subject to this section

shall cause or allow an emission of carbon monoxide in excess of the applicable emission limit identified in Table 38-3 of this subdivision.

Table 38-3. Carbon Monoxide Emission Limits.

Municipal waste combustor technology	**Carbon monoxide emission limit, measured in parts per million volume at the combustor outlet and corrected to seven percent oxygen, dry basis, or equivalent percentage carbon dioxide as specified in subdivision (c)(12) of this section**	**Averaging time, in hours, calculated as an arithmetic average**
Mass burn refractory combustor	100	4
Mass burn waterwall combustor	100	4
Processed-municipal solid waste combustor	200	24
Reciprocating grate waste tire fired incinerator/boiler	180	4

(11) The emission limits and operating requirements of this section shall apply at all times except during periods of startup, shutdown or malfunction as provided in this subdivision:

(A) For determining compliance with an applicable carbon monoxide emissions limit, if a loss of boiler water level control or a loss of combustion air control is determined to be a malfunction, the duration of the malfunction period shall be limited to fifteen (15) hours per occurrence. Otherwise, the duration of each startup, shutdown or malfunction period shall be limited to three hours per occurrence for all MWC units;

(B) For the purpose of compliance with the opacity emission limits, during each period of startup, shutdown or malfunction, the opacity limits shall not be exceeded during more than five (5) 6-minute arithmetic average measurements; and

(C) During periods of startup, shutdown, or malfunction, monitoring data shall be excluded from calculations of compliance with the emission limits and operating requirements of this subdivision but shall be recorded and reported in accordance with subsections (k) and (*l*) of this section.

(12) All emission limits in this subsection, except for those identified for opacity, shall be corrected to seven percent oxygen (7% O_2), unless the owner or operator submits information to justify a correction to an equivalent percent carbon dioxide (% CO_2) and receives the commissioner's written approval. If the owner or operator of a MWC seeks to use an equivalent % CO_2, the owner or operator must demonstrate the relationship between

O_2 and CO_2 levels as specified in subsection (i)(4)(J) of this section and submit a written report to the commissioner summarizing the results of the demonstration. This relationship may be reestablished during any performance test conducted pursuant to subsection (i) of this section.

(13) Reserved.

(14) Notwithstanding subparagraphs (D), (E) and (F) of subdivision (4) of subsection (i) of this section, for the purpose of submitting compliance certifications or for the purpose of the commissioner establishing whether the owner or operator has violated or is in violation of any emission limit or standard in this subdivision, nothing shall preclude the commissioner's use, including the exclusive use, of any appropriate performance test results, credible evidence or information relevant to demonstrating compliance with the applicable requirements of this section.

(15) Notwithstanding subdivision (12) of this subsection, the owner or operator of a reciprocating grate waste tire fired incinerator/boile$_r$ shall correct all emission $_l$imits, except for those identified for opacity, to 12% CO_2.

(16) On and after January 1, 2018, no owner or operator of a municipal waste combustor unit using a selective non-catalytic reduction system for control of nitrogen oxides shall cause or allow the emission of ammonia in excess of the applicable emission limit identified in Table 38-4.

Table 38-4. Ammonia Emission Limit.

Air pollutant	**Emission limit**
Ammonia	20 parts per million by volume (ppmvd) at 7% oxygen

(17) Continuous compliance with the ammonia emission limit established in subdivision (16) of this subsection shall be determined based on either annual stack testing as specified in subsection (i)(4)(L) of this section or a CEM system as specified in subsection (j)(4) of this section.

(d) Reserved.

(e) Reserved.

(f) **Fugitive ash emissions.**

(1) No owner or operator of a municipal waste combustor plant shall cause to be discharged to the atmosphere visible emissions of combustion ash from an ash conveying system, including conveyor transfer points, in excess of five percent (5 %) of the observation period (i.e., nine (9) minutes per three-hour period), as specified in subsection (i)(4)(I) of this section.

(2) The emission limit specified in subdivision (1) of this subsection does not cover visible emissions discharged inside buildings or within enclosures of ash conveying systems; however, the emission limit specified in subdivision (1) of this subsection does cover visible emissions discharged to the atmosphere from buildings or enclosures of ash conveying systems.

(3) The provisions specified in subdivision (1) of this subsection do not apply during maintenance and repair of ash conveying systems, however, all reasonable measures to control fugitive emissions on such occasions shall be implemented.

(g) **Operating practices.**

(1) No owner or operator of a municipal waste combustor unit shall cause or allow such unit to operate at a temperature, measured at each particulate control device inlet, more than seventeen (17) degrees centigrade, based on a 4-hour block average, above the maximum demonstrated particulate control device temperature measured during the most recent performance test for dioxin/furan emissions for which compliance with the dioxin/furan emissions limit was achieved.

(2) No owner or operator of a municipal waste combustor unit shall cause or allow such unit to operate at a municipal waste combustor unit load greater than one hundred ten percent (110%) of the maximum demonstrated municipal waste combustor unit load, based on a 4-hour block average, measured during the most recent performance test for dioxin/furan emissions for which compliance with the dioxin/furan emissions limit was achieved. Municipal waste combustor unit load shall be measured by a steam flow meter.

(3) An owner or operator may, notwithstanding subdivisions (1) and (2) of this subsection, during the annual dioxin/furan emissions performance test and for two (2) weeks prior to such test, allow temperatures in excess of that specified in subdivision (1) of this subsection and municipal waste combustor unit load limits in excess of that specified in subdivision (2) of this subsection. However, should the owner or operator operate the unit at such excess temperatures and load, the owner or operator shall not again be allowed to operate at such excess temperatures and load during that test period without the approval of the commissioner should the annual dioxin/furan emission performance test be postponed.

(4) The particulate matter control device temperature limits, municipal waste combustor unit load limit and the average carbon mass feed rate may be waived temporarily by the commissioner to allow evaluation of system performance, testing of new technology or control technologies or diagnostic testing, provided that any such temporary waiver is authorized through a permit or order issued prior to an evaluation of system performance, testing of new technology or control technologies or diagnostic testing.

(5) During the operation of a MWC unit, the carbon injection system operating parameter(s) that is the primary indicator(s) of the carbon mass feed rate (e.g., screw feeder setting) shall be averaged over a block 8-hour period, and the 8-hour block average shall equal or exceed the level(s) documented during the performance tests specified under subsection (i) of this section.

(6) Notwithstanding subdivision (5) of this subsection, during the annual dioxin/furan or mercury performance test and the two weeks preceding the annual dioxin/furan or mercury performance test, no limit is applicable for the average mass carbon feed rate if the provisions of subdivision (4) of this subsection are met.

(h) **Operator training and certification.**

(1) No owner or operator of a municipal waste combustor plant shall cause or allow such plant to be operated at any time unless a certified chief operator or shift operator is physically present at the plant.

(2) Operators shall be certified by the commissioner under section 22a-231-1 of the Regulations of Connecticut State Agencies and shall be identified as either a Class I or Class II chief operator or a Class I or Class II shift operator.

(3) Not later than six (6) months after the date of employment, all chief operators and shift operators must satisfactorily complete an operator training course conducted by the commissioner.

(4) The owner or operator of a municipal waste combustor shall have a site-specific Municipal Waste Combustor Operating & Maintenance Manual with an index. Such Municipal Waste Combustor Operating & Maintenance Manual shall be updated on an annual basis. The Municipal Waste Combustor Operating & Maintenance Manual shall include:

(A) A summary of the applicable emission limits and operational requirements;

(B) A description of basic combustion theory applicable to a municipal waste combustor unit;

(C) Procedures for receiving, handling, and feeding municipal solid waste;

(D) Procedures for startup, shutdown and malfunction;

(E) Procedures for maintaining proper combustion air supply levels;

(F) Procedures for operating the combustor within the standards established under this section;

(G) Procedures for responding to periodic upset or off-specification conditions;

(H) Procedures for minimizing particulate matter carryover;

(I) Procedures for handling ash;

(J) Procedures for monitoring emissions; and

(K) Procedures for reporting and record keeping.

(5) The owner or operator of a municipal waste combustor plant shall establish a training program to review the Municipal Waste Combustor Operating & Maintenance Manual with each person who has responsibilities affecting the operation of a MWC plant including, but not limited to, the chief operator, shift operator, ash handler, maintenance employee and crane/load handler. The owner or operator shall train new employees with the job positions identified in this subdivision prior to each new employee's assumption of any responsibilities at a MWC plant. Following initial training, the training program shall be repeated on an annual basis for each person identified in this subdivision.

(6) The Operating & Maintenance Manual shall be kept in a location readily accessible to all persons identified in subdivision (5) of this subsection and shall be available for inspection by the commissioner or Administrator upon request.

(i) **Performance testing.**

(1) All performance tests shall be conducted under representative full load operating conditions.

(2) The owner or operator of a municipal waste combustor shall conduct an annual performance test for dioxin/furan, particulate matter, hydrogen chloride, cadmium, lead, mercury and fugitive ash at least once per calendar year. Such test shall be conducted no less than nine (9) calendar months and no more than fifteen (15) calendar months following the previous performance test for such pollutant.

(3) Notwithstanding subdivision (2) of this subsection, upon demonstration for two (2) consecutive years that the dioxin/furan emission levels from all units at a MWC plant for which construction commenced prior to September 20, 1994 are less than fifteen (15) ng/dscm total mass or, for all units for which construction, modification or reconstruction

commenced on or after September 20, 1994, and are less than seven (7) ng/dscm total mass, the MWC owner or operator shall only be required to conduct performance testing for dioxin/furan on one unit at that MWC plant. The owner or operator shall rotate performance testing among units in a fixed sequence so that each unit is tested at the same frequency. One unit at the plant shall be tested at least once per calendar year, and such test shall be conducted no less than nine calendar months and no more than 15 calendar months following the previous performance test. If in any year following the year of election of such reduced testing, the dioxin/furan emission test results indicate a level equal to or greater than fifteen (15) ng/dscm total mass for any unit for which construction commenced prior to September 20, 1994, or greater than seven (7) ng/dscm total mass for any unit for which construction, modification or reconstruction commenced on or after September 20, 1994, then the MWC owner or operator shall resume testing of all units at the MWC plant during the next annual performance test. The owner or operator shall continue to test all units on an annual basis until the performance tests for all units indicate dioxin/furan emission levels that meet the requirements of this subdivision, at which time the owner/operator may resume testing in accordance with this subdivision.

(4) Each MWC owner or operator shall employ the following methodologies:

(A) Testing for particulate matter and opacity levels shall be conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 1 shall be used to select the sampling site and number of traverse points for particulate matter testing,

(ii) 40 CFR 60, Appendix A, Reference Method 3 shall be used for flue gas analysis for particulate matter testing,

(iii) 40 CFR 60, Appendix A, Reference Method 5 or 29 shall be used for determining compliance with the particulate matter emission limit. For each Method 5 or Method 29 test run: the minimum sample volume shall be 1.7 cubic meters; the probe and filter holder heating systems in the sample train shall be set to provide a gas temperature no greater than 160 [+/- 14] degrees centigrade; and an oxygen or carbon dioxide measurement shall be obtained simultaneously. For each Method 29 test run, the minimum sample time shall be two (2) hours,

(iv) 40 CFR 60, Appendix A, Reference Method 9 shall be used for determining compliance with the opacity emissions limit, except as provided under 40 CFR 60.11(e), and

(v) The compliance determination for particulate matter shall be based on an arithmetic average determined using all data generated in three (3) test runs as required by this section;

(B) Testing for cadmium and lead levels shall be conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 1 shall be used for determining the location and number of sampling points,

(ii) 40 CFR 60, Appendix A, Reference Method 3 shall be used for flue gas analysis,

(iii) 40 CFR 60, Appendix A, Reference Method 29 shall be used for determining compliance with the cadmium and lead emission limits,

(iv) An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 29 test run for cadmium and lead required under this section,

(v) The minimum sample time shall be two (2) hours per each Method 29 test run, and

(vi) The compliance determinations for cadmium and lead shall be based on an arithmetic average determined using all data generated in three (3) test runs as required by this section;

(C) Testing for mercury levels shall be conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 1 shall be used for determining the location and number of sampling points,

(ii) 40 CFR 60, Appendix A, Reference Method 3 shall be used for flue gas analysis,

(iii) 40 CFR 60, Appendix A, Reference Method 29 shall be used for determining compliance with the mercury emission limits. An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 29 test run for mercury required under this section,

(iv) The minimum sample time shall be two (2) hours per each Method 29 test run,

(v) The percent reduction in the potential mercury emissions ($\%P_{Hg}$) is computed using the following:

$$\left(\%\,P_{Hg}\right) = \left(\frac{E_i - E_o}{E_i}\right) \times 100$$

where:

$\%P_{hg}$ = percent reduction of the potential mercury emissions achieved.

E_i = potential mercury emission concentration measured at the control device inlet, corrected to 7% O_2 (dry basis).

E_o = controlled mercury emission concentration measured at the mercury control device outlet, corrected to 7_2 (dry basis), and

(vi) The compliance determinations for mercury shall be based on an arithmetic average of emission concentrations or percent reductions determined using all data generated in a minimum of at least three (3) test runs as required by this section;

(D) Compliance with the sulfur dioxide emission limit (measured as a concentration or as a percent reduction by weight or volume) shall be determined by using the CEM system specified in subsection (j)(1) of this section;

(E) Compliance with the nitrogen oxide emission limit shall be determined by using the CEM system specified in subsection (j)(1) of this section;

(F) Compliance with the carbon monoxide emission limit shall be determined by using the CEM system specified in subsection (j)(1) of this section;

(G) Testing for hydrogen chloride levels shall be conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 26 or 26A, as applicable, shall be used to determine the hydrogen chloride emission concentration. The minimum sampling time for Method 26 shall be one (1) hour,

(ii) An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 26 test run for hydrogen chloride required by this section,

(iii) The percent reduction in potential hydrogen chloride emissions (% P_{HCl}) shall be

computed using the following equation:

$$(\%\, P_{HCl}) = \left(\frac{E_i - E_o}{Ei} \right) \times 100$$

where:

$\%P_{HCl}$ = percent reduction of the potential hydrogen chloride emissions achieved.

E_i = potential hydrogen chloride emission concentration measured at the control device inlet, corrected to 7% O_2 (dry basis).

EE_o = controlled hydrogen chloride emission concentration measured at the control device outlet, corrected to 7 % O_2 (dry basis), and

(iv) The compliance determination for hydrogen chloride shall be based on an arithmetic average of emission concentrations or percent reductions determined using all data generated in three (3) test runs as required by this section;

(H) Testing for dioxin/furan levels shall be conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 1 shall be used for determining the location and number of sampling points,

(ii) 40 CFR 60, Appendix A, Reference Method 3 shall be used for flue gas analysis,

(iii) 40 CFR 60, Appendix A, Reference Method 23 shall be used for determining the dioxin/furan emission concentration,

(iv) The minimum sample time shall be four (4) hours per test run,

(v) An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 23 test run for dioxin/furan required by this section, and

(vi) The compliance determination for dioxin/furan levels shall be based on an arithmetic average determined using all data generated as required by this section in three (3) test runs;

(I) Testing for fugitive ash emissions shall be conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 22 shall be used for determining compliance with the fugitive ash emissions limit,

(ii) The minimum observation time shall be a series of three (3) one-hour observations, and

(iii) The observation period shall include representative operational times when the facility is transferring ash from the municipal waste combustor unit to the area where ash is stored or loaded into containers or trucks;

(J) Testing for the relationship between carbon dioxide and oxygen shall be conducted in accordance with the following procedures:

(i) At least three (3) test runs of CO_2 and O_2 diluent data shall be obtained using the procedures and methods contained in 40 CFR 60, Appendix A, Reference Method 3A or 3B,

(ii) For each test run, using the following equation, a calculation shall be made of the CO_2 correction factor which is equivalent to a 7% O_2 correction factor:

$$CO_2\ correction\ factor = \frac{13.9}{\left(20.9 - O_{2measured}\right)} \times CO_{2measured}$$

, and

(iii) Calculation of a unit-specific equivalent CO_2 correction factor shall be the arithmetic mean of the result obtained from the three (3) test runs and the calculation of the CO_2 correction factor for each test run pursuant to subparagraph (J)(ii) of this subdivision, rounded to the nearest whole number;

(K) During the performance tests for dioxin/furan and mercury, as applicable, the owner or operator shall estimate an average carbon mass feed rate based on carbon injection system operating parameters such as the screw feeder speed, hopper volume, hopper refill frequency, or other parameters appropriate to the feed system being employed, as follows:

(i) An average carbon mass feed rate in kilograms per hour or pounds per hour shall be estimated during the initial performance test for mercury emissions and each subsequent performance test for mercury emissions, and

(ii) An average carbon mass feed rate in kilograms per hour or pounds per hour shall be estimated during the initial performance test for dioxin/furan emissions and each subsequent performance test for dioxin/furan emissions; and

(L) Compliance with the ammonia emission limit established in subdivision (16) of subsection (c) of this section shall be determined for each unit by either using a CEM system specified in subdivision (4) of subsection (j) of this section or annual stack testing conducted in accordance with the following procedures:

(i) 40 CFR 60, Appendix A, Reference Method 26A or another method approved by the commissioner and the EPA shall be used to determine compliance with the ammonia emission limit,

(ii) The emission compliance determination for ammonia shall be based on an arithmetic average determined using all data generated in three test runs, and

(iii) The minimum sample time shall be one hour per each Method 26A test run.

(5) The initial performance test for ammonia, as applicable, shall be conducted at the time the first annual performance test after January 1, 2018 is conducted. Subsequent annual performance tests for ammonia shall be conducted not earlier than nine (9) calendar months and not later than fifteen (15) calendar months following the previous performance test for ammonia.

(j) **Compliance monitoring.**

(1) Continuous compliance with the emission limits specified in this section for opacity, sulfur dioxide (SO_2), SO_2 reduction efficiency, nitrogen oxides (NO_x) and carbon monoxide shall be determined based on continuous emission monitoring system data. The owner or operator of a municipal waste combustor shall install, operate and calibrate such continuous emission monitoring system in a manner acceptable to the commissioner and certify to the commissioner, in writing, that the equipment specifications for the continuous emission monitoring system have been and are being met. In addition to the aforementioned continuous monitoring systems, the owner or operator of a municipal waste combustor shall also install, operate, calibrate and maintain continuous monitoring systems for measuring

the final particulate control device inlet temperature, municipal waste combustor unit load and the oxygen or carbon dioxide content of the flue gas at each location where carbon dioxide, sulfur dioxide or nitrogen oxide emissions are monitored, and, if activated carbon is used to control dioxin/furan or mercury emissions, the carbon feed rate. CEM systems shall meet the following requirements:

(A) Opacity monitors shall meet the applicable performance and quality assurance requirements of 40 CFR 60, Appendix B, Performance Specification 1; section 22a-174-4 of the Regulations of Connecticut State Agencies; and 40 CFR 60.13;

(B) O_2 and CO_2 monitors shall meet the applicable performance and quality assurance requirements of 40 CFR 60, Appendix B, Performance Specification 3; 40 CFR 60, Appendix F, Procedure 1; and 40 CFR 60.13;

(C) SO_2 monitors shall:

(i) Meet the applicable performance and quality assurance requirements of 40 CFR 60, Appendix B, Performance Specification 2; 40 CFR 60, Appendix F, Procedure 1; and 40 CFR 60.13, and

(ii) For units that have actual inlet emissions less than 100 ppmdv, the relative accuracy criterion for inlet sulfur dioxide CEM systems should be no greater than twenty percent (20%) of the mean value of the reference method test data in terms of the units of the emission standard, or five ppmdv absolute value of the mean difference between the reference method and the continuous emission monitoring systems, whichever is greater;

(D) NO_X monitors shall meet the applicable performance and quality assurance requirements of 40 CFR 60, Appendix B, Performance Specification 2; 40 CFR 60, Appendix F, Procedure 1; and 40 CFR 60.13;

(E) Carbon monoxide monitors shall:

(i) Meet the applicable performance and quality assurance requirements of 40 CFR 60, Appendix B, Performance Specification 4 or 4A (as applicable); 40 CFR 60, Appendix F, Procedure 1 and 40 CFR 60.13, and

(ii) For units subject to the 100 ppmdv carbon monoxide standard, the relative accuracy criterion of five ppmdv is calculated as the absolute value of the mean difference between the reference method and the CEM system;

(F) Continuous monitoring systems for MWC unit load shall meet the requirements of 40 CFR 60.1810(a); and

(G) If activated carbon is used to control dioxin/furan or mercury emissions:

(i) Monitoring of the carbon feed rate shall meet the requirements of 40 CFR 60.1820, and

(ii) Pneumatic injection pressure or another carbon injection system operational indicator shall be used to provide additional verification of proper carbon injection system operation. The operational indicator shall provide an instantaneous visual or audible alarm to alert the operator of a potential interruption in the carbon feed that would not normally be indicated by direct monitoring of carbon mass feed rate (e.g. continuous weight loss feeder) or monitoring of the carbon system operating parameter or parameters that are the indicator or indicators of the carbon mass feed rate (e.g. screw feeder speed). The carbon injection system operational indicator used to provide additional verification of carbon injection system operation, including basis for selecting the indicator and operator response to the

indicator alarm, shall be included in the site-specific Municipal Waste Combustor Operating & Maintenance Manual.

(2) A MWC owner or operator shall comply with the following minimum data requirements:

(A) Data available for gaseous and process CEMs shall not be less than ninety percent (90%) of the total operating hours in any one calendar quarter and not less than ninety-five percent (95%) of the total operating hours in any one calendar year;

(B) Data available for opacity CEMs shall not be less than ninety-five percent (95%) of the total operating hours in any one calendar quarter;

(C) Obtain valid 1-hour averages for seventy-five percent (75%) of the operating hours per day for ninety percent (90%) of the operating days per calendar quarter during which the unit combusts any municipal solid waste;

(D) At least three equally spaced data points per hour shall be used to calculate a one-hour average;

(E) Notify the commissioner according to subsection (*l*)(3)(A)(v) of this section in the event of failure to obtain the minimum data required by subparagraphs (A) and (B) of this subdivision; and

(F) The percentage of data available shall be calculated as follows:

(i) In accordance with the procedures specified on forms furnished or prescribed by the commissioner, and

(ii) Using all data obtained from a CEM to calculate emissions concentrations and percent reductions as required by this section regardless of whether the minimum data availability requirements of subparagraphs (A) and (B) of this subdivision are obtained.

(3) During a loss of boiler water level control or a loss of combustion air control malfunction period, a diluent cap of fourteen percent for oxygen or five percent for carbon dioxide may be used in the emissions calculations for sulfur dioxide and nitrogen oxides.

(4) The owner or operator of a municipal waste combustor unit at which a selective non-catalytic reduction system is installed and operated for control of NOx emissions may install, operate and calibrate, in a manner acceptable to the commissioner, a CEM system for measuring ammonia emissions and certify to the commissioner, in writing, that the equipment specifications for the CEM system have been met. Continuous compliance with the emission limit for ammonia shall be determined based on a 24-hour daily average. The owner or operator using a CEM system to measure ammonia emissions shall meet the following requirements:

(A) Ammonia CEM system performance specifications and quality assurance procedures are subject to review by the commissioner and shall not be implemented until approval from the commissioner has been received; and

(B) The owner or operator shall be required to monitor ammonia slip at each MWC unit, as follows:

(i) Data available for the ammonia CEM system shall not be less than ninety percent (90%) of the total operating hours in any one calendar quarter and not less than ninety-five percent (95%) of the total operating hours in any one calendar year,

(ii) Obtain valid 1-hour averages for seventy-five percent (75%) of the operating hours per day for ninety percent (90%) of the operating days per calendar quarter during which

the unit combusts any municipal solid waste,

(iii) At least three equally spaced data points per hour shall be used to calculate a one hour average,

(iv) Notify the commissioner according to subsection (l)(3)(A)(v) of this section in the event of failure to obtain the minimum data required by subparagraphs (B)(i) and (B)(ii) of this subdivision, and

(v) The percentage of data available shall be calculated as follows:

(I) In accordance with the procedures specified on forms furnished or prescribed by the commissioner, and

(II) Using all data obtained from a CEM system to calculate emissions concentrations and percent reductions as required by this section regardless of whether the minimum data availability requirements of subparagraphs (B)(i) and (B)(ii) of this subdivision are obtained.

(k) **Record keeping requirements.**

(1) The owner or operator of a municipal waste combustor shall maintain records of the information specified in subdivisions (2) through (13) of this subsection, as applicable, labeling each record with the time and calendar date on which the data was generated. Each record shall be maintained for a period of at least five (5) years from the date the record was created.

(2) Operator training and certification records shall be maintained on an annual basis, as follows:

(A) The names of the chief operators and shift operators, certified by the commissioner, and employed at the plant, including the dates of initial and renewal certifications and documentation of current certification;

(B) The names of the chief operators and shift operators who have completed an operator training course as required under subsection (h)(3) of this section; and

(C) The names of the persons at the plant who have completed a training program as required under subsection (h)(5) of this section.

(3) Emission concentrations and parameters, measured using a CEM system, shall be recorded as specified in this subdivision:

(A) All six-minute arithmetic average opacity levels;

(B) All one-hour average sulfur dioxide emission concentrations;

(C) All one-hour average sulfur dioxide reduction efficiency levels;

(D) All one-hour average nitrogen oxides emission concentrations; and

(E) All one-hour average carbon monoxide emission concentrations, municipal waste combustor unit load measurements, and particulate matter control device inlet temperatures.

(4) Average concentrations and percent reductions, as applicable, shall be maintained as specified in this subdivision:

(A) All 24-hour daily geometric average sulfur dioxide emission concentrations and all 24-hour daily geometric average percent reductions in sulfur dioxide emissions;

(B) All 24-hour daily average nitrogen oxides emission concentrations;

(C) All 4-hour block or 24-hour daily average carbon monoxide emission concentrations, as applicable; and

(D) All 4-hour block average municipal waste combustor unit loads and particulate matter control device inlet temperatures.

(5) The calendar dates when any of the average emission concentrations, percent reductions, operating parameters or opacity levels recorded under subdivisions (3) or (4) of this subsection are above the applicable limit shall be identified. The reasons for such exceedances, a description of corrective actions taken and a description of the measures taken to prevent future exceedances shall also be recorded.

(6) The calendar dates for which the minimum number of hours of any of the data required by this section have not been obtained shall be identified, the reasons for not obtaining sufficient data, a description of corrective actions taken and a description of the measures taken to prevent future losses of data.

(7) Where sulfur dioxide emissions data, nitrogen oxides emissions data or operational data (i.e., carbon monoxide emissions, municipal waste combustor unit load and particulate matter control device temperature) have been excluded from the calculation of average emission concentrations or parameters, the owner or operator shall identify such exclusion as well as the reason(s) for excluding the data.

(8) The results of daily calibrations and quarterly accuracy determinations for opacity, sulfur dioxide, nitrogen oxides, carbon monoxide and oxygen or carbon dioxide continuous emission monitoring systems shall be recorded.

(9) The test reports and supporting calculations documenting the results of an initial performance test conducted to determine compliance with the emission limits specified in this section for particulate matter, opacity, cadmium, lead, mercury, dioxin/furan emissions, hydrogen chloride, fugitive ash and, as applicable, ammonia, shall be recorded. The maximum demonstrated municipal waste combustor unit load and maximum demonstrated particulate matter control device temperature shall be recorded for the initial performance test for dioxin/furan emissions for each particulate matter control device. The test results and supporting calculations documenting the relationship between carbon dioxide and oxygen concentrations established in accordance with this section shall be recorded if established during the initial performance test.

(10) The test reports and supporting calculations documenting the results of all annual performance tests conducted to determine compliance with the emission limits specified in this section for particulate matter, cadmium, lead, mercury, dioxin/furan emissions, hydrogen chloride, fugitive ash and, as applicable, ammonia, shall be recorded. The maximum demonstrated municipal waste combustor unit load and maximum demonstrated particulate matter control device temperature (for each particulate matter control device) shall be recorded for each performance test for dioxin/furan emissions. The relationship between carbon dioxide and oxygen concentrations shall be recorded if the relationship is reestablished during the annual performance test.

(11) For MWCs equipped with activated carbon injection systems for mercury or dioxin/furan emissions control, the records specified in this subdivision shall be maintained:

(A) Estimates of the average carbon mass feed rate, measured in kilograms per hour or pounds per hour, during the initial mercury performance test and all subsequent annual performance tests, with supporting calculations;

(B) Estimates of the average carbon mass feed rate, measured in kilograms per hour or pounds per hour, during the initial dioxin/furan emissions performance test and all subsequent annual performance tests, with supporting calculations;

(C) Estimates of the average carbon mass feed rate, measured in kilograms per hour or pounds per hour, for each hour of operation, with supporting calculations;

(D) For each calendar quarter, estimates of the total carbon usage for each MWC unit in kilograms or pounds for each calendar quarter by two independent methods, according to the procedures specified below:

(i) For each MWC unit, estimate the weight of carbon delivered, and

(ii) For each MWC unit, estimate the average carbon mass feed rate in kilograms per hour or pounds per hour for each hour of operation based on the parameters specified under subsection (i)(4)(K) of this section, and sum the results for the total number of hours of operation during the calendar quarter;

(E) Carbon injection system operating parameter data for the parameter(s) that are the primary indicator(s) of carbon feed rate (e.g., screw feeder speed); and

(F) The times and calendar dates when average carbon mass feed rates were less than either of the hourly carbon feed rates estimated during mercury or dioxin/furan emissions tests. The reasons for such feed rates and a description of corrective actions taken shall also be recorded.

(12) For each MWC unit, the following records of air pollution control device operation shall be maintained:

(A) For each reagent, the feed rate to the air pollution control device, measured in kilograms per hour or pounds per hour, during the annual particulate emissions performance tests, with supporting calculations;

(B) For each reagent, the feed rate to the air pollution control device, measured in kilograms per hour or pounds per hour, for each hour of operation, with supporting calculations; and

(C) For each calendar quarter, total reagent usage for each MWC unit in kilograms or pounds for each calendar quarter.

(13) For each MWC unit, the following information shall be recorded daily:

(A) Daily fossil fuel usage rates for each fuel; and

(B) Daily hours of operation, in which periods of startup and shutdown are distinguished.

(*l*) **Reporting requirements.**

(1) Reserved.

(2) For each MWC unit, the MWC owner or operator shall submit a quarterly report to the commissioner within thirty (30) days following the end of each calendar quarter in which the data were collected. Each quarterly report shall include the following information:

(A) All data recorded pursuant to this section during the calendar quarter;

(B) Each calendar date during the calendar quarter reported when any of the average emission concentrations, percent reductions, operating parameters or opacity levels recorded exceeded the applicable limit identified in this section; the reasons the limit was exceeded and a description of the corrective actions taken;

(C) For MWCs equipped with activated carbon injection systems for mercury or dioxin/furan emissions control, the following information:

(i) Identification of the calendar dates during the calendar quarter reported when average carbon mass feed rates were less than either of the hourly carbon feed rates estimated during mercury or dioxin/furan emissions tests, and the rates recorded. The reasons for such feed

rates and a description of the corrective actions taken shall also be reported,

(ii) The total carbon purchased for and delivered to the MWC plant or purchased for and delivered to each MWC unit for the reported calendar quarter, and

(iii) The required usage of carbon for the reported calendar quarter for the MWC plant or for each MWC unit at the plant, calculated using equation 4 or 5 of 40 CFR 60.1935(f); and

(D) The data and results of any CEM quality assurance testing conducted pursuant to this section.

(3) The MWC owner or operator shall submit an annual report to the commissioner no later than January 30 of each year following the calendar year in which the data were collected. Each annual report shall include the following information:

(A) A summary of data collected for each pollutant regulated under this section and all applicable parameters, as follows:

(i) A list of the particulate matter, opacity, cadmium, lead, mercury, dioxin/furan, hydrogen chloride, fugitive ash and, as applicable, ammonia emission levels, achieved during all initial and annual performance tests,

(ii) A list of the highest emission level recorded for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load, particulate matter control device inlet temperature and, as applicable, ammonia based on the data recorded for 24-hour daily geometric averages, 24-hour daily averages, or 4-hour block averages, as applicable, for the aforementioned pollutants,

(iii) The highest six-minute average opacity level measured,

(iv) The relationship between carbon dioxide and oxygen, if such relationship is reestablished, including test results, identification of the units tested and the date and time of each test run, and, as necessary, a schedule for making the appropriate modifications to the CEM system to incorporate the equivalent % CO_2 correction factor,

(v) The total number of days that the minimum number of hours of data for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load, particulate matter control device temperature and, as applicable, carbon mass feed rate and ammonia were not obtained, and

(vi) The total number of hours that data for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load, particulate matter control device temperature and, as applicable, carbon mass feed rate and ammonia were excluded from the calculation of average emission concentrations or parameters;

(B) The information required by subparagraphs (A)(i), (A)(ii) and (A)(iii) of this subdivision for the previous calendar year; and

(C) The data summaries required by subparagraphs (A) and (B) of this subdivision shall highlight any emission or parameter levels that did not achieve the emission or parameter limits specified under this section.

(4) At least ninety (90) days before any MWC owner or operator plans to conduct any performance test required under this subsection, such owner or operator shall submit a performance test plan for review and written approval of the commissioner. Such plan shall contain, at a minimum, the following information:

(A) sampling locations;

(B) test methods;
(C) sampling protocols;
(D) sample analysis procedures; and
(E) any other information required by the commissioner.

(5) The MWC owner or operator shall provide written notification to the commissioner three (3) business days prior to conducting any performance test required under this subsection.

(6) The MWC owner or operator shall provide written notification to the commissioner within seventy-two (72) hours of the time at which such owner or operator receives information regarding performance test results indicating that any particulate matter, opacity, cadmium, lead, mercury, dioxin/furan, hydrogen chloride, ammonia or fugitive ash emission levels exceed the applicable pollutant emission limits or standards defined in this section.

(7) Any report required to be submitted to the commissioner by this section shall include a certification signed in accordance with section 22a-174-2a(a)(4) of the Regulations of Connecticut State Agencies.

(8) The MWC owner or operator shall submit all reports and notifications required by this subsection on forms furnished or prescribed by the commissioner.

(9) The MWC owner or operator shall submit all reports specified under this subsection as a paper copy, with supporting data in either paper or electronic format, postmarked on or before the submittal dates specified in this subsection, and maintain such reports at the premises as a paper copy with any supporting data in the format submitted for a period of five (5) years from the date of submission to the commissioner.

(m) **Duty to comply.**

(1) The owner or operator of a MWC subject to this section who is unable to comply with the requirements of this section shall, at the discretion of the commissioner, enter into a legally enforceable cease operation agreement with the commissioner. The cease operation agreement shall specify a date, no later than one year from the date that the inability to comply is discovered, by which operations shall cease.

(2) Nothing in this section shall limit the commissioner's authority to impose further restrictions or requirements in a permit issued to the owner or operator of a MWC unit.

(Adopted effective June 28, 1999; Amended October 26, 2000; Amended February 2, 2004; Amended April 1, 2004; Amended July 7, 2008; Amended February 1, 2010; Amended August 2, 2016)