7035.2910 MUNICIPAL WASTE COMBUSTOR ASH TESTING REQUIREMENTS.

Subpart 1. **Definitions.** As used in subparts 1 to 12, the following terms have the meanings given them in this subpart.

A. "Analysis sample" means a sample which is to be delivered to a laboratory for analysis.

B. "Composite sample" means a sample that is formed by mixing two or more samples together to create a sample which is representative of a longer time period or a greater amount of material.

C. "Grab sample" refers to a sample collected at one time or location.

Subp. 2. **Scope.** Subparts 1 to 12 apply to owners and operators of municipal solid waste combustors.

Subp. 3. **Frequency.** The owner or operator must collect ash samples at least quarterly. Sample collection must be begun within seven days of January 15, April 15, July 15, and October 15, unless otherwise approved by the commissioner. Quarterly samples and an annual composite sample formed from equal portions of the quarterly samples must be analyzed according to subpart 5. Quarterly samples must be analyzed within appropriate sample holding times, or 45 days after sample collection is completed, whichever is less.

Subp. 4. **Test methods.** The owner or operator must analyze samples for total composition, leaching potential, and physical characteristics for the following testing parameters, using test methods issued by the United States Environmental Protection Agency or the American Society for Testing and Materials unless the method is approved as provided by item D. The test methods must obtain detection limits equal to or less than those specified in this subpart.

A. Total composition:

(1) Table 1: Quarterly Testing Parameters:

Parameter	**Maximum Detection Limit**	
(a) Aluminum	2.0	mg/kg
(b) Arsenic	1.7	mg/kg
(c) Cadmium	0.16	mg/kg
(d) Lead	0.8	mg/kg
(e) Manganese	2.4	mg/kg
(f) Mercury	0.08	mg/kg

(g) Nickel	5.6	mg/kg
(h) Selenium	1.3	mg/kg
(i) Zinc	56	mg/kg
(j) Other parameters listed in subitem (2) or (3) which are required by the commissioner based on results of previous testing.		

(2) Table 2: Annual Testing Parameters:

Parameter	**Maximum Detection Limit**	
(a) Barium	4	mg/kg
(b) Boron	4	mg/kg
(c) Calcium	40	mg/kg
(d) Chloride	40	mg/kg
(e) Chromium	0.72	mg/kg
(f) Copper	0.8	mg/kg
(g) Iron	0.4	mg/kg
(h) Magnesium	0.4	mg/kg
(i) Silver	0.8	mg/kg
(j) Sodium	4	mg/kg
(k) Strontium	2.0	mg/kg
(l) Sulfate	40	mg/kg
(m) Tin	1.2	mg/kg

(3) Table 3: Special Annual Testing Parameters:

Parameter	**Method**	**Maximum Detection Limit**	
(a) Dioxins	EPA 8290	10	ng/kg
(b) Furans	EPA 8290	10	ng/kg

(4) EPA Method 3050 for metals digestion must be used for total composition analysis.

B. Leaching potential: use EPA Method 1312, the Synthetic Precipitation Leach Test for Soils, with extraction fluid no. 2 (pH=5.0) to satisfy the leaching potential testing requirements of this part.

(1) Table 1: Quarterly Testing Parameters:

Parameter	**Maximum Detection Limit**	
(a) Aluminum	1000	µg/l
(b) Arsenic	25	µg/l
(c) Cadmium	4	µg/l
(d) Lead	20	µg/l
(e) Manganese	20	µg/l
(f) Mercury	2	µg/l
(g) Nickel	20	µg/l
(h) Selenium	20	µg/l
(i) Zinc	20	µg/l
(j) pH of ash and of leachate produced by the leach test	+/-0.1 pH units	
(k) Other parameters listed in subitem (2) which are required by the commissioner based on results of previous testing.		

(2) Table 2: Annual Testing Parameters:

Parameter	**Maximum Detection Limit**	
(a) Alkalinity	1000	µg/l
(b) Barium	100	µg/l
(c) Boron	100	µg/l
(d) Calcium	1000	µg/l
(e) Chemical Oxygen Demand	4000	µg/l
(f) Chloride	1000	µg/l
(g) Chromium	18	µg/l
(h) Copper	20	µg/l

(i) Iron	10	µg/l
(j) Magnesium	10	µg/l
(k) Silver	20	µg/l
(l) Sodium	100	µg/l
(m) Strontium	50	µg/l
(n) Sulfate	1000	µg/l
(o) Tin	30	µg/l

(3) EPA SW-846 Method 3050 must be used for metals digestion.

C. Physical characteristics:

Parameter	**Method**
(1) Moisture content	ASTM D3173
(2) Percent combustible	ASTM D3174

D. The owner or operator may propose alternative test methods for the commissioner's review and approval. The owner or operator must demonstrate that the proposed alternative methods are equivalent in terms of accuracy and precision to the methods required by this subpart.

E. The owner or operator may move a parameter from the quarterly parameter lists of item A, subitem (1), and item B, subitem (1), to the annual parameter lists of item A, subitem (2), and item B, subitem (2), if the parameter has not been detected above the detection limits specified in this subpart for eight or more consecutive sampling events. The owner or operator must report changes in the parameter lists as part of the annual report required by subpart 10.

Subp. 5. **Number of analyses.** The owner or operator must collect and analyze fly ash and bottom ash samples separately according to item A. In cases where bottom and fly ash are mixed, collect and analyze samples of combined ash according to item B, and fly ash samples according to item A. If ash treatment occurs prior to disposal, collect samples after treatment.

A. Owners and operators of facilities which manage bottom and fly ash separately must test ash quarterly according to subitem (1), and annually according to subitem (2).

(1) At a minimum the following number of samples must be analyzed: four samples of bottom ash and two samples of fly ash for total composition for the parameters listed in subpart 4, item A, subitem (1); three samples of bottom ash and three samples of fly ash for leaching potential for the parameters listed in subpart 4, item B, subitem (1); and

three samples of bottom ash and three samples of fly ash for the physical characteristics tests listed in subpart 4, item C.

(2) At a minimum the following number of analyses of the annual composite samples must be performed: four samples of bottom ash and two samples of fly ash for total composition for the parameters listed in subpart 4, item A, subitem (2); two samples of fly ash for total composition for the parameters listed in subpart 4, item A, subitem (3); three samples of bottom ash and three samples of fly ash for leaching potential for the parameters listed in subpart 4, item B, subitem (2), and three samples of bottom ash and three samples of fly ash for moisture content in accordance with subpart 4, item C, subitem (1). For at least the first two years of sampling and analyses performed in accordance with this part, annual composite samples must be analyzed for the quarterly testing parameters listed in subpart 4, item A, subitem (1), and item B, subitem (1), in addition to the annual parameters required by this subitem.

B. Owners and operators of facilities which manage combined ash must test ash quarterly according to subitem (1), and annually according to subitem (2).

(1) At a minimum the following number of samples must be analyzed: six samples for total composition for the parameters listed in subpart 4, item A, subitem (1); six samples for leaching potential for the parameters listed in subpart 4, item B, subitem (1); and six samples for the physical characteristics tests listed in subpart 4, item C.

(2) At a minimum the following number of analyses of the annual composite sample must be performed: six samples for total composition for the parameters listed in subpart 4, item A, subitem (2); two samples for total composition for the parameters listed in subpart 4, item A, subitem (3); six samples for leaching potential for the parameters listed in subpart 4, item B, subitem (2), and six samples for moisture content in accordance with subpart 4, item C, subitem (1). For at least the first two years of sampling and analyses performed in accordance with this part, analyze annual composite samples for the quarterly testing parameters listed in subpart 4, item A, subitem (1) and item B, subitem (1), in addition to the annual parameters required by this subitem.

Subp. 6. **Ash sampling plan.** The owner or operator must perform ash sampling according to an ash sampling plan approved by the commissioner. Proposed changes to sampling equipment or procedures must be submitted to the commissioner for review and approval. The plan must contain at least the following information:

A. specification of the training and experience qualifications of persons who collect ash samples;

B. description of equipment used to collect, process, and store ash samples;

C. identification of sampling equipment cleaning procedures and other actions taken to prevent sample contamination;

D. identification of the location or locations where ash samples are collected;

E. description of procedures used to collect grab samples;

F. description of procedures used to process grab samples to form composite samples;

G. description of chain-of-custody and sample storage procedures; and

H. identification of ash sampling quality assurance and quality control measures.

Subp. 7. **Sampling equipment requirements.** Equipment used for ash sampling must comply with items A to D.

A. Sampling equipment must be constructed of materials which are compatible with ash and will not contaminate samples.

B. Containers which are used to hold analysis samples must be prepared according to standard laboratory procedures identified in EPA SW-846, chapter three, for metallic analytes and chapter four for organic analytes, and EPA Document 600/4-79-020 "Methods for Chemical Analyses of Water and Wastes." Part 7035.0605 incorporates these documents by reference and establishes their availability.

C. Sampling equipment must be cleaned before use each quarter. During the sampling event, equipment must be cleaned before each use or cover it to protect it from exposure between uses.

D. Sampling equipment must be used which is large enough to collect a reasonably complete range of ash particle sizes. The size of the opening of sampling equipment used before screening ash samples must be at least three times the diameter of the largest ash particle or 12 inches, whichever is smaller. Equipment used after samples have been screened must have an opening size of at least two inches.

Subp. 8. **Sample collection methods.** Methods used to collect samples to satisfy the requirements of this part must comply with items A to H.

A. Samples must be collected that represent the average quality of ash produced at the waste combustor during the sampling event. Factors which affect the content of samples, such as timing of fly ash addition to bottom ash and sample collection locations must be considered.

B. Samples must be collected at times and locations which have been selected before sample collection begins for that quarter.

C. Samples must be collected by persons who meet the training and experience qualifications specified in the approved sampling plan.

D. Samples must be protected from changes in composition due to exposure to precipitation, wind, sun, absorbent or reactive materials, and extremes of temperature. Samples must be stored in covered containers.

E. The circulation of air through sampling equipment must be minimized to prevent the loss of fines and moisture. If a cement mixer or similar equipment is used to mix samples as required by subpart 9, items A and G, cover the equipment during mixing.

F. Grab samples must be collected according to subitems (1) to (3). Analysis samples must be taken from composite samples formed by processing and mixing grab samples according to subpart 9.

(1) Samples must be collected over a time period of at least one week. Samples must be collected every day that a facility operates during a week unless the commissioner approves otherwise. If the waste combustor is unable to operate for the entire week, sample collection must be resumed after operation begins so that the final composite sample includes ash collected on each day of the operating week.

(2) Grab samples must be collected at least eight times per day at evenly-spaced intervals of no less than one hour if samples are collected from a conveying system. If samples are collected from a location where ash collects over time, such as a storage building or truck, samples must be collected from different locations so that samples represent ash produced over at least eight hours.

(3) Grab samples must be collected of approximately equal weight. Grab samples of bottom ash or combined ash must consist of a minimum of 15 pounds (seven kilograms) of ash. Grab samples of fly ash must consist of a minimum of one pound (one-half kilogram) of ash if the waste combustor produces less than ten tons of fly ash in one week, and two pounds (one kilogram) of ash if the waste combustor produces ten tons or more of fly ash per week.

G. A minimum of three pounds (one and one-half kilograms) of each ash composite sample must be retained for at least one year. These samples must be held in moisture-tight containers which are filled as full as possible, protected from sunlight and extremes of temperature, and kept in a secure place.

H. All analysis samples must be refrigerated and the samples retained according to item G.

Subp. 9. **Sample processing.** The owner or operator must process bottom and combined ash samples according to items A to H. Fly ash samples must be processed according to items A and H.

A. Grab samples must be thoroughly mixed together to form one composite sample for each type of ash collected.

B. Samples must be screened using a three-eighths inch screen. All or a portion of the composite sample may be screened. At a minimum, 35 pounds of ash must be screened.

C. The weight of ash which passes through the screen and the weight of ash which does not pass through the screen must be recorded.

D. The size of friable pieces of ash which are larger than three-eighths inch must be reduced.

E. All ash which was caught by the screen initially must be rescreened to separate ash which has been reduced to less than three-eighths inch by the process in item D.

F. The weight of ash which remains on the screen and ash which passes through the screen must be recorded.

G. Ash which passes through the screen after size reduction must be combined and thoroughly mixed with the ash which originally passed through the screen.

H. Bottom and combined ash analysis samples from the composite ash sample formed by the process in item G must be taken. Fly ash analysis samples from the composite sample formed by the process in item A must be taken. Ash which will be retained according to subpart 8, item G, must also be taken from this ash.

Subp. 10. **Annual ash testing report.** The owner or operator must submit an annual ash testing report to the commissioner by March 15 of each year. The report must include the information in items A to F.

A. Results of quarterly and annual analyses of ash as required by this part. Total composition results must be reported on a dry weight basis.

B. Discussion of the data, including identification of trends observed by comparing the most recent year's results with those of previous years. In particular, the owner or operator must assess whether the waste combustor is in compliance with the goals of Minnesota Statutes, section 115A.97, subdivision 1, clause (1).

C. Data quality assurance assessment, including the following:

(1) precision and accuracy of each method used;

(2) representativeness of the samples;

(3) potential effect of any field or laboratory contamination on the sampling results; and

(4) qualification or rejection of data based on the results of quality control samples.

D. Information summarizing operation of the waste combustor during the ash sampling periods, and data regarding ash sample processing recorded according to subpart

9. Operating information must include an estimate of the quantity and type of wastes other than mixed municipal solid waste which were combusted at the facility during the ash sampling period. If leachate was added to the waste during the sampling period, the quantity of leachate added and source of the leachate must be noted.

E. Certification by the owner or operator that samples analyzed to fulfill the requirements of this part were collected according to the plan required by subpart 6, and that no actions were taken during the sample collection period to intentionally affect the results of ash sample analysis so that the results would not be representative of ash typically generated by the waste combustor. Such actions may include, for example, altering the type of waste combusted during the sampling period.

F. Identification of any changes in test methods or parameters made in accordance with subpart 4, items D and E.

Subp. 11. **Special requirements for new facilities.** Waste combustors which begin operation after April 27, 1992, must comply with the requirements of this subpart.

A. The ash sampling plan required by subpart 6 must be submitted to the commissioner for review and approval at least 90 days before the first time waste is fired in the combustor.

B. Samples must begin to be collected within 60 days after reaching the maximum continuous rating for the waste combustor, but not more than 180 days after waste is first fired in the combustor.

C. The first four quarterly samples must be analyzed for the parameters listed in subpart 4, item A, subitems (1), (2), and (3), item B, subitems (1) and (2), and item C, subitems (1) and (2).

D. Quarterly testing reports to the commissioner must be submitted for the first four quarters. A report for each quarter within three months after the first day of sample collection for that quarter must be submitted. The contents of the reports must comply with the requirements of subpart 10, items A, C, D, and E.

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