

**§ 444.11 Definitions.**

As used in this part the general definitions and abbreviations in 40 CFR part 401 shall apply.

*Commercial hazardous waste combustor* means any thermal unit, except a cement kiln, that is subject either to 40 CFR part 264, subpart O; 40 CFR part 265, subpart O; or 40 CFR part 266, subpart H if the thermal unit burns RCRA hazardous wastes received from off-site for a fee or other remuneration in the following circumstances. The thermal unit is a commercial hazardous waste combustor if the off-site wastes are generated at a facility not under the same corporate structure or subject to the same ownership as the thermal unit and

(1) The thermal unit is burning wastes that are not of a similar nature to wastes being burned from industrial processes on site or

(2) There are no wastes being burned from industrial processes on site. Examples of wastes of a “similar nature” may include the following: Wastes generated in industrial operations whose wastewaters are subject to the same provisions in 40 CFR subchapter N or wastes burned as part of a product stewardship activity. The term commercial hazardous waste combustor includes the following facilities: a facility that burns exclusively waste received from off-site; and, a facility that burns both wastes generated on-site and wastes received from off-site. Facilities that may be commercial hazardous waste combustors include hazardous waste incinerators, rotary kiln incinerators, lime kilns, lightweight aggregate kilns, and boilers. A facility not otherwise a commercial hazardous waste combustor is not a commercial hazardous waste combustor if it burns RCRA hazardous waste for charitable organizations, as a community service or as an accommodation to local, state or government agencies so long as the waste is burned for no fee or other remuneration.

*Commercial hazardous waste combustor wastewater* means wastewater attributable to commercial waste combustion operations, but includes only wastewater from air pollution control systems and water used to quench flue gas or slag generated as a result of

commercial hazardous waste combustor operations.

*Off-site* means outside the boundaries of a facility.

*On-site* means within the boundaries of a facility.

*Parameters* are defined as Parameters at 40 CFR 136.2 in Table 1B, which also cites the approved methods of analysis.

(1) *Arsenic* means total arsenic, Parameter 6.

(2) *Cadmium* means total cadmium, Parameter 12.

(3) *Chromium* means total chromium, Parameter 19.

(4) *Copper* means total copper, Parameter 22.

(5) *Lead* means total lead, Parameter 32.

(6) *Mercury* means total mercury, Parameter 35.

(7) *pH* means hydrogen ion, Parameter 28.

(8) *Silver* means total silver, Parameter 62.

(9) *Titanium* means total titanium, Parameter 72.

(10) *TSS* means total suspended solids, Parameter 55.

(11) *Zinc* means total zinc, Parameter 75.

*POTW* means a publicly owned treatment works.

**§ 444.12 Monitoring requirements.**

(a) Both direct and indirect discharges must monitor to establish compliance with their limitations and standards. Thus, all the permits of all direct dischargers must include requirements to monitor, according to EPA-approved test procedures, each pollutant limited in the permit, the volume of effluent discharged from each outfall, and other appropriate measurements subject to notification requirements. See 40 CFR 122.44(i). EPA’s pretreatment regulations similarly require indirect dischargers to monitor to demonstrate compliance with pretreatment standards. See 40 CFR 403.12(g).

(b) Incorporation by reference:

(1) Compliance with the monitoring requirements may be accomplished using approved test procedures listed in the table to this paragraph. Most of these test procedures have previously been incorporated by reference at 40

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CFR 136.3(a), Table IB. The test procedures for the regulated pollutants (arsenic, cadmium, chromium (total), copper, pH, lead, mercury, TSS, silver, titanium, and zinc) listed in the table to this paragraph are also incorporated by reference into this regulation. The full texts of the test procedures listed in this paragraph are available from the sources indicated in paragraph (b)(2) of this section. In addition to those test procedures incorporated by reference at 40 CFR 136.3(a), Table IB, you may also use EPA Method 200.8, "Determination of Trace Elements in Water and Wastes by Inductively Coupled

Plasma-Mass Spectrometry," from "Methods for Determination of Metals in Environmental Samples—Supplement I," EPA-600/R-94-111, May 1994, and ASTM Method D 5673-96, "Standard Test Method for Elements in Water by Inductively Coupled Plasma—Mass Spectrometry," from 1999 Annual Book of ASTM Standards, for determination of arsenic, cadmium, chromium (total), copper, lead, silver, and zinc. The full texts of these methods are incorporated by reference into this regulation and may be obtained from the sources identified in paragraph (b)(2) of this section.

LIST OF APPROVED INORGANIC TEST PROCEDURES

Parameter, units and method	Reference (method number or page)				
	EPA 1,16	Standard Methods [18th Edition] <sup>6</sup>	ASTM	USGS <sup>2</sup>	Other
1. Arsenic—Total, <sup>4</sup> mg/L:					
Digestion <sup>4</sup> followed by	206.5				
AA gaseous hydride .....	206.3	3114B 4.d	D2972-93(B)	I-3062-85	
AA furnace .....	206.2	3113B	D2972-93(C)		
ICP/AES <sup>15</sup> .....	<sup>5</sup> 200.7	3120 B			
Colorimetric (SDDC), or	206.4	3500-As C	D2972-93(A)	I-3060-85	
ICP/MS .....	<sup>7</sup> 200.8		D5673-96 <sup>17</sup>		
2. Cadmium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:					
AA direct aspiration <sup>15</sup> ...	213.1	3111 B or C	D3557-90(A or B)	I-3135-85 or I-3136-85	974.27, <sup>3</sup> p. 37.
AA furnace .....	213.2	3113 B	D3557-90(D)		
ICP/AES <sup>15</sup> .....	<sup>5</sup> 200.7	3120 B			
DCP <sup>15</sup> .....			D4190-82(88)	I-1472-85	( <sup>14</sup> )
Voltametry <sup>9</sup> .					
Colorimetric (Dithizone), or		3500-Cd D	D3557-90(C)		
ICP/MS .....	<sup>7</sup> 200.8		D5673-96 <sup>17</sup>		
3. Chromium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:					
AA direct aspiration <sup>15</sup> ...	218.1	3111 B	D1687-92(B)	I-3236-85	974.27. <sup>3</sup>
AA chelation-extraction	218.3	3111 C			
AA furnace .....	218.2	3113 B	D1687-92(C)		
ICP/AES <sup>15</sup> .....	<sup>5</sup> 200.7	3120 B			
DCP <sup>15</sup> .....			D4190-82(88)		( <sup>14</sup> )
Colorimetric (Diphenylcarbazide), or		3500-Cr D			
ICP/MS .....	<sup>7</sup> 200.8		D5673-96 <sup>17</sup>		
4. Copper—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:					
AA direct aspiration <sup>15</sup> ...	220.1	3111 B or C	D1688-90(A or B)	I-3270-85 or I-3271-85	974.27 <sup>3</sup> p. 37. <sup>8</sup>
AA furnace .....	220.2	3113 B	D1688-90(C)		
ICP/AES <sup>15</sup> .....	<sup>5</sup> 200.7	3120 B			
DCP <sup>15</sup> or .....			D4190-82(88)		( <sup>14</sup> )
Colorimetric (Neocuproine) or		3500-Cu D			
(Bicinchoninate), or .....		or E			( <sup>10</sup> )
ICP/MS .....	<sup>7</sup> 200.8		D5673-96 <sup>17</sup>		
5. Hydrogen ion (pH), pH units:					
Electrometric measurement.	150.1	4500-H+B	D1293-84 (90)(A or B)	I-1586-85	973.41.
Automated electrode .....					( <sup>11</sup> )
6. Lead—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by:					
AA direct aspiration <sup>15</sup> ...	239.1	3111 B or C	D3559-90(A or B)	I-3399-85	974.27. <sup>3</sup>

LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units and method	Reference (method number or page)				
	EPA <sup>1,16</sup>	Standard Methods [18th Edition] <sup>6</sup>	ASTM	USGS <sup>2</sup>	Other
AA furnace .....	239.2	3113 B	D3559–90(D)		
ICP/AES <sup>15</sup> .....	<sup>5</sup> 200.7	3120 B			
DCP <sup>15</sup> .....			D4190–82(88)		(14)
Voltametry <sup>9</sup> .....			D3559–90(C)		
Colorimetric (Dithizone), or, ICP/MS .....	<sup>7</sup> 200.8	3500–Pb D	D5673–96 <sup>17</sup>		
7. Mercury—Total, <sup>4</sup> mg/L: Cold vapor, manual or .. Automated .....	245.1 245.1	3112 B	D3223–91	I–3462–85	977.22. <sup>3</sup>
8. Residue—nonfilterable (TSS), mg/L: Gravimetric, 103–105–post washing of residue. ....	160.2	2540 D		I–3765–85	
9. Silver—Total, <sup>4</sup> mg/L: Digestion <sup>4,12</sup> followed by: AA direct aspiration .....	272.1	3111 B or C		I–3720–85	974.27 <sup>3</sup> p. 37. <sup>8</sup>
AA furnace .....	272.2	3113 B			
ICP/AES .....	<sup>5</sup> 200.7	3120 B			(14)
DCP, or .....					
ICP/MS .....	<sup>7</sup> 200.8		D5673–96 <sup>17</sup>		
10. Titanium—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by: AA direct aspiration .....	283.1	3111 D			
AA furnace, or .....	283.2				(14)
DCP .....					
11. Zinc—Total, <sup>4</sup> mg/L; Digestion <sup>4</sup> followed by: AA direct aspiration <sup>15</sup> ...	289.1	3111 B or C	D1691–90(A) or B)	I–3900–85	974.27. <sup>3</sup> p. 37. <sup>8</sup>
AA furnace .....	289.2				
ICP/AES <sup>15</sup> .....	<sup>5</sup> 200.7	3120 B			(14)
DCP <sup>15</sup> .....			D4190–82(88)		
Colorimetric (Dithizone) or, (Zincon), or .....		3500–Zn E			(14)
ICP/MS .....	<sup>7</sup> 200.8	3500–Zn F	D5673–96 <sup>17</sup>		(13)

Table Notes:  
<sup>1</sup>“Methods for Chemical Analysis of Water and Wastes,” Environmental Protection Agency, Environmental Monitoring Systems Laboratory—Cincinnati (EML-CI), EPA–600/4–79–020, Revised March 1983 and 1979 where applicable.  
<sup>2</sup>Fishman, M.J., et al. “Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments,” U.S. Department of the Interior, Techniques of Water—Resource Investigations of the U.S. Geological Survey, Denver, CO, Revised 1989.  
<sup>3</sup>“Official Methods of Analysis of the Association of Official Analytical Chemists,” methods manual, 15th ed. (1990).  
<sup>4</sup>For the determination of total metals the sample is not filtered before processing. A digestion procedure is required to solubilize suspended material and to destroy possible organic-metal complexes. Two digestion procedures are given in “Methods for Chemical Analysis of Water and Wastes, 1979 and 1983”. One (Section 4.1.3), is a vigorous digestion using nitric acid. A less vigorous digestion using nitric and hydrochloric acids (Section 4.1.4) is preferred; however, the analyst should be cautioned that this mild digestion may not suffice for all samples types. Particularly, if a colorimetric procedure is to be employed, it is necessary to ensure that all organo-metallic bonds be broken so that the metal is in a reactive state. In those situations, the vigorous digestion is to be preferred making certain that at no time does the sample go to dryness. Samples containing large amounts of organic materials may also benefit by this vigorous digestion, however, vigorous digestion with concentrated nitric acid will convert antimony and tin to insoluble oxides and render them unavailable for analysis. Use of ICP/AES as well as determinations for certain elements such as antimony, arsenic, the noble metals, mercury, selenium, silver, tin, and titanium require a modified sample digestion procedure and in all cases the method write-up should be consulted for specific instructions and/or cautions. NOTE.—If the digestion procedure for direct aspiration AA included in one of the other approved references is different than the above, the EPA procedure must be used.  
Dissolved metals are defined as those constituents which will pass through a 0.45 micron membrane filter. Following filtration of the sample, the referenced procedure for total metals must be followed. Sample digestion of the filtrate for dissolved metals (or digestion of the original sample solution for total metals) may be omitted for AA (direct aspiration or graphite furnace) and ICP analyses, provided the sample solution to be analyzed meets the following criteria:  
a. Has a low COD (<20)  
b. Is visibly transparent with a turbidity measurement of 1 NTU or less  
c. Is colorless with no perceptible odor, and  
d. Is of one liquid phase and free of particulate or suspended matter following acidification.  
<sup>5</sup>EPA Method 200.7, “Inductively Coupled Plasma Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes,” from “Methods for Determination of Metals in Environmental Samples—Supplement I,” EPA–600/R–94–111, May 1994.  
<sup>6</sup>“Standard Methods for the Examination of Water and Wastewater,” 18th Edition (1992).  
<sup>7</sup>EPA Method 200.8, “Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry,” from “Methods for Determination of Metals in Environmental Samples—Supplement I,” EPA–600/R–94–111, May 1994.

<sup>8</sup> American National Standard on Photographic Processing Effluents, Apr. 2, 1975. Available from ANSI, 1430 Broadway, New York, NY 10018.

<sup>9</sup> The use of normal and differential pulse voltage ramps to increase sensitivity and resolution is acceptable.

<sup>10</sup> Copper, Bicinchoninate Method, Method 8506, Hach Handbook of Water Analysis, 1979, Hach Chemical Company, PO Box 389, Loveland, CO 80537.

<sup>11</sup> Hydrogen Ion (pH) Automated Electrode Method, Industrial Method Number 378—75WA, October 1976, Bran & Luebbe (Technicon) Autoanalyzer II, Bran & Luebbe Analyzing Technologies, Inc., Elmsford, NY 10523.

<sup>12</sup> Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/L and above are inadequate where silver exists as an inorganic halide. Silver halides such as the bromide and chloride are relatively insoluble in reagents such as nitric acid but are readily soluble in an aqueous buffer of sodium thiosulfate and sodium hydroxide to pH of 12. Therefore, for levels of silver above 1 mg/L, 20 mL of sample should be diluted to 100 mL by adding 40 mL each of 2 M Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> and NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/L the approved method is satisfactory.

<sup>13</sup> Zinc, Zincon Method, Method 8009, Hach Handbook of Water Analysis, 1979, pages 2-231 and 2-333, Hach Chemical Company, Loveland, CO 80537.

<sup>14</sup> Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes, Method AES0029," 1986—Revised 1991, Thermo Jarrell Ash Corporation, 27 Forge Parkway, Franklin, MA 02038.

<sup>15</sup> Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals," CEM Corporation, P.O. Box 200, Matthews, NC 28106-0200, April 16, 1992. Available from the CEM Corporation.

<sup>16</sup> Precision and recovery statements for the atomic absorption direct aspiration and graphite furnace methods, and for the spectrophotometric SDDC method for arsenic are provided in appendix D of 40 CFR part 136 and titled, "Precision and Recovery Statements for Methods for Measuring Metals."

<sup>17</sup> This method does not include the digestion for solids given in Method 200.8. Not using the solids digestion procedure could affect the determined concentrations. Therefore, this method may not be used for analysis of aqueous samples with suspended solids greater than 1%.

(2) The full texts of the methods from the following references which are cited in the table in paragraph (b)(1) of this section are incorporated by reference into this regulation and may be obtained from the sources identified. All costs cited are subject to change and must be verified from the indicated sources. The full texts of all the test procedures cited are available for inspection at the Analytical Methods Staff, Office of Water, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

APPENDIX TO § 444.12(b)—REFERENCES, SOURCES, COSTS, AND TABLE CITATIONS:

(1) "Methods for Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA-600/4-79-020, Revised March 1983 and 1979 where applicable. Available from: ORD Publications, CERL, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268. [Note 1]

(2) "Standard Methods for the Examination of Water and Wastewater." Joint Editorial Board, American Public Health Association, American Water Works Association, and Water Environment Federation, 18th Edition, 1992. Available from: American Public Health Association, 1015 15th Street NW, Washington, DC 20005. [Note 6]

(3) "Annual Book of ASTM Standards—Water and Environmental Technology," Sec-

tion 11, Volumes 11.01 (Water I) and 11.02 (Water II), 1994. [1996 for D5673-96; see Note 17]. American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

(4) "Methods for the Determination of Metals in Environmental Samples—Supplement I", National Exposure Risk Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, OH 45268, EPA 600 R-94/111, May 1994. [Notes 5 and 7]

(5) "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," by M.J. Fishman and Linda C. Friedman, Techniques of Water Resources Investigations of the U.S. Geological Survey, Book 5 Chapter A1 (1989). Available from: U.S. Geological Survey, Denver Federal Center, Box 25425, Denver, CO 80225. Cost: \$108.75 (subject to change). [Note 2]

(6) "Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals," CEM Corporation, P.O. Box 200, Matthews, North Carolina 28106-0200, April 16, 1992. Available from the CEM Corporation. [Note 15]

(7) "Official Methods of Analysis of AOAC—International, 15th Edition," 1990. Price: \$359.00. Available from: AOAC—International, 1970 Chain Bridge Rd., Dept. 0742, McLean, VA 22109-0742. [Note 3]

(8) "American National Standard on Photographic Processing Effluents," April 2, 1975. Available from: American National Standards Institute, 11 West 42nd Street, New York, New York 10036. [Note 8]

(9) Bicinchoninate Method for Copper, Method 8506, Hach Handbook of Water Analysis, 1979, Method and price available from Hach Chemical Company, P.O. Box 300, Loveland, Colorado 80537. [Note 10]

(10) Hydrogen Ion (pH) Automated Electrode Method, Industrial Method Number 378-75WA, October 1976. Bran & Luebbe (Technicon) Auto Analyzer II. Method and

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price available from Bran & Luebbe Analyzing Technologies, Inc. Elmsford, N.Y. 10523. [Note 11]

(11) Zincon Method for Zinc, Method 8009. Hach Handbook for Water Analysis, 1979. Method and price available from Hach Chemical Company, P.O. Box 389, Loveland, Colorado 80537. [Note 13]

(12) "Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes," Method AES 0029, 1986 Revised 1991, Thermo Jarrell Ash Corporation (508-520-1880), 27 Forge Parkway, Franklin, MA 02038. [Note 14]

[65 FR 4381, Jan. 27, 2000, as amended at 65 FR 70315, Nov. 22, 2000; 69 FR 18803, Apr. 9, 2004]

**§ 444.13 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).**

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the application of BPT:

Regulated parameter	Maximum daily	Maximum monthly avg.
TSS .....	113,000	34,800
Arsenic .....	84	72
Cadmium .....	71	26
Chromium .....	25	14
Copper .....	23	14
Lead .....	57	32
Mercury .....	2.3	1.3
Silver .....	13	8
Titanium .....	60	22
Zinc .....	82	54
pH .....	( <sup>2</sup> )	( <sup>2</sup> )

<sup>1</sup> Micrograms per liter (ppb)

<sup>2</sup> Within the range 6 to 9.

**§ 444.14 Effluent limitations attainable by the application of the best conventional pollutant control technology (BCT).**

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the application of BCT: Limitations for TSS and pH are the same as the corresponding limitation specified in § 444.13.

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**§ 444.15 Effluent limitations attainable by the application of the best available technology economically achievable (BAT).**

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the application of BAT: Limitations for arsenic, cadmium, chromium, copper, lead, mercury, silver, titanium and zinc are the same as the corresponding limitation specified in § 444.13.

**§ 444.16 Pretreatment standards for existing sources (PSES).**

Except as provided in 40 CFR 403.7 and 403.13, any source that introduces wastewater pollutants into a POTW must comply with part 403 and achieve the following pretreatment standards:

Regulated parameter	Maximum daily	Maximum monthly avg.
Arsenic .....	84	72
Cadmium .....	71	26
Chromium .....	25	14
Copper .....	23	14
Lead .....	57	32
Mercury .....	2.3	1.3
Silver .....	13	8
Titanium .....	60	22
Zinc .....	82	54

<sup>1</sup> Micrograms per liter (ppb)

**§ 444.17 New source performance standards (NSPS).**

Any new source subject to this subpart must achieve the following performance standards: Standards for TSS, arsenic, cadmium, chromium, copper, lead, mercury, silver, titanium, zinc and pH are the same as the corresponding limitation specified in § 444.13.

**§ 444.18 Pretreatment standards for new sources (PSNS).**

Except as provided in 40 CFR 403.7, any source that introduces wastewater pollutants into a POTW must comply with 40 CFR part 403 and achieve the following pretreatment standards: Standards for arsenic, cadmium, chromium, copper, lead, mercury, silver, titanium and zinc are the same as the