

2. "EPA Protocol for the Use of Extractive Fourier Transform Infrared (FTIR) Spectrometry in Analyses of Gaseous Emissions from Stationary Industrial Sources," February, 1995.

3. "Measurement of Gaseous Organic and Inorganic Emissions by Extractive FTIR Spectroscopy," EPA Contract No. 68-D2-0165, Work Assignment 3-08.

4. "Method 301—Field Validation of Pollutant Measurement Methods from Various Waste Media," 40 CFR 63, App A.

*17.0 Tables, Diagrams, Flowcharts, and Validation Data*

**TABLE 1.—ARRANGEMENT OF VALIDATION MEASUREMENTS FOR STATISTICAL ANALYSIS**

Measurement (or average)	Time	Spiked (ppm)	d, spiked	Unspiked (ppm)	d, unspiked
1 .....		S <sub>1</sub>	S <sub>2</sub> - S <sub>1</sub>	U <sub>1</sub>	U <sub>2</sub> - U <sub>1</sub>
2 .....		S <sub>2</sub>		U <sub>2</sub>	
3 .....		S <sub>3</sub>	S <sub>4</sub> - S <sub>3</sub>	U <sub>3</sub>	U <sub>4</sub> - U <sub>3</sub>
4 .....		S <sub>4</sub>		U <sub>4</sub>	
5 .....		S <sub>5</sub>	S <sub>6</sub> - S <sub>5</sub>	U <sub>5</sub>	U <sub>6</sub> - U <sub>5</sub>
6 .....		S <sub>6</sub>		U <sub>6</sub>	
7 .....		S <sub>7</sub>	S <sub>8</sub> - S <sub>7</sub>	U <sub>7</sub>	U <sub>8</sub> - U <sub>7</sub>
8 .....		S <sub>8</sub>		U <sub>8</sub>	
9 .....		S <sub>9</sub>	S <sub>10</sub> - S <sub>9</sub>	U <sub>9</sub>	U <sub>10</sub> - U <sub>9</sub>
10 .....		S <sub>10</sub>		U <sub>10</sub>	
11 .....		S <sub>11</sub>	S <sub>12</sub> - S <sub>11</sub>	U <sub>11</sub>	U <sub>12</sub> - U <sub>11</sub>
12 .....		S <sub>12</sub>		U <sub>12</sub>	
Average -> .....		S <sub>m</sub>		M <sub>m</sub>	

**TABLE 2.—T=VALUES**

n - 1 <sup>a</sup>	t - value	n - 1 <sup>a</sup>	t - value	n - 1 <sup>a</sup>	t - value	n - 1 <sup>a</sup>	t - value
11	2.201	17	2.110	23	2.069	29	2.045
12	2.179	18	2.101	24	2.064	30	2.042
13	2.160	19	2.093	25	2.060	40	2.021
14	2.145	20	2.086	26	2.056	60	2.000
15	2.131	21	2.080	27	2.052	120	1.980
16	2.120	22	2.074	28	2.048	8	1.960

<sup>(a)</sup>n is the number of independent pairs of measurements (a pair consists of one spiked and its corresponding unspiked measurement). Either discreet (independent) measurements in a single run, or run averages can be used.

\* \* \* \* \*

**PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS**

1. The authority citation for Part 61 continues to read as follows: 42 U.S.C. 7401, 7412, 7413, 7414, 7416, 7601, and 7602.

2. In § 61.18, paragraph (a) is revised to read as follows:

**§ 61.18 Incorporation by reference.**

\* \* \* \* \*

(a) The following materials are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103; or University Microfilms

International, 300 North Zeeb Road, Ann Arbor, MI 48106.

(1) ASTM D737-75, Standard Test Method for Air Permeability of Textile Fabrics, incorporation by reference (IBR) approved January 27, 1983 for § 61.23(a).

(2) ASTM D835-85, Standard Specification for Refined Benzene-485, IBR approved September 14, 1989 for § 61.270(a).

(3) ASTM D836-84, Standard Specification for Industrial Grade Benzene, IBR approved September 14, 1989 for § 61.270(a).

(4) ASTM D1193-77, 91, Standard Specification for Reagent Water, IBR approved for Appendix B: Method 101, Section 7.1.1; Method 101A, Section 7.1.1; and Method 104, Section 7.1; Method 108, Section 7.1.3; Method

108A, Section 7.1.1; Method 108B, Section 7.1.1; Method 108C, Section 7.1.1; and Method 111, Section 7.3.

(5) ASTM D2267-68, 78, 88, Aromatics in Light Naphthas and Aviation Gasoline by Gas Chromatography, IBR approved September 30, 1986, for § 61.67(h)(1).

(6) ASTM D2359-85a, 93, Standard Specification for Refined Benzene-535, IBR approved September 14, 1989 for § 61.270(a).

(7) ASTM D2382-76, 88, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), IBR approved June 6, 1984 for § 61.245(e)(3).

(8) ASTM D2504-67, 77, 88, 93, Noncondensable Gases in C<sub>3</sub> and Lighter Hydrocarbon Products by Gas

Chromatography, IBR approved June 6, 1984 for § 61.245(e)(3).

(9) ASTM D2986-71, 78, 95a, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Diocetyl Phthalate) Smoke Test, IBR approved for Appendix B: Method 103, Section 6.1.3.

(10) ASTM D4420-94, Standard Test Method for Determination of Aromatics in Finished Gasoline by Gas Chromatography, IBR approved for § 61.67(h)(1).

(11) ASTM D4734-87, 96, Standard Specification for Refined Benzene-545, IBR approved September 14, 1989 for § 61.270(a).

(12) ASTM D4809-95, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), IBR approved for § 61.245(e)(3).

(13) ASTM E50-82, 86, 90 (Reapproved 1995), Standard Practices for Apparatus Reagents, and Safety Precautions for Chemical Analysis of Metals, IBR approved for Appendix B: Method 108C, Section 6.1.4.

\* \* \* \* \*

#### § 61.20 [Amended]

3. Amend § 61.20 as follows:

a. Paragraph (a) is amended by revising the words "100,000 tons" to read "90,720 megagrams (Mg) (100,000 tons)."

b. Paragraph (b) is amended by revising the words "10,000 tons" to read "9,072 Mg (10,000 tons)."

c. Paragraph (b) is amended by revising the words "100,000 tons" to read "90,720 Mg (100,000 tons)."

#### § 61.21 [Amended]

4. In § 61.21(b), the words "Effective dose equivalent means the sum of the products of absorbed dose and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its distribution in the body of reference man" are revised to read "Effective dose equivalent means the sum of the products of the absorbed dose and appropriate effectiveness factors. These factors account for differences in biological effectiveness due to the quality of radiation and its distribution in the body of reference man."

#### § 61.23 [Amended]

5. Amend § 61.23 as follows:

a. In paragraph (a), the first sentence is amended by revising the abbreviation "EPA" to read "U.S. Environmental Protection Agency (EPA)."

b. In paragraph (a), the second sentence is amended by revising the word "Appendix" to read "appendix."

#### § 61.24 [Amended]

6. Amend § 61.24 as follows:

a. In paragraph (a), the first sentence is amended by revising the words "used in making the calculation" to read "used in making the calculations."

b. In paragraph (a), the second sentence is amended by revising the words "Such report shall" to read "This report shall."

#### § 61.30 [Amended]

7. In § 61.30, paragraph (a) is amended by revising the words "Extraction plans" to read "Extraction plants."

#### § 61.32 [Amended]

8. Amend § 61.32 as follows:

a. Paragraph (a) is amended by revising the words "10 grams" to read "10 grams (0.022 lb)."

b. Paragraphs (b) and (b)(1)(i) are amended by revising the words "0.01  $\mu\text{g}/\text{m}^3$ " to read "0.01  $\mu\text{g}/\text{m}^3$  ( $4.37 \times 10^{-6}$   $\text{gr}/\text{ft}^3$ )" wherever they occur.

#### § 61.42 [Amended]

9. Amend § 61.42 as follows:

a. Paragraph (a) is amended by revising the words "75 microgram minutes per cubic meter of air" to read "75 microgram minutes per cubic meter ( $\mu\text{g}\cdot\text{min}/\text{m}^3$ ) (4.68 pound minutes per cubic foot ( $\text{lb}\cdot\text{min}/\text{ft}^3$ )) of air."

b. Paragraph (b) is amended by revising the words "2 grams per hour" to read "2.0 g/hr (0.0044 lb/hr)."

c. Paragraph (b) is amended by revising the words "10 grams per day" to read "10 g/day (0.022 lb/day)."

#### § 61.52 [Amended]

10. Amend § 61.52 as follows:

a. Paragraph (a) is amended by revising the words "2300 grams" to read "2.3 kg (5.1 lb)."

b. Paragraph (b) is amended by revising the words "3200 grams" to read "3.2 kg (7.1 lb)."

#### § 61.53 [Amended]

11. In § 61.53, paragraph (c) is amended by revising the words "1,300 gms/day" to read "1.3 kg/day (2.9 lb/day)."

#### § 61.55 [Amended]

12. Amend § 61.55 as follows:

a. In paragraph (a), the second sentence is amended by revising the words "1,600 g" to read "1.6 kg (3.5 lb)."

b. Paragraph (b)(1) is amended by revising the words "Reference Method" to read "Method" wherever they occur.

c. Paragraph (c)(4) is amended by revising the words "established in 2" to

read "established in paragraph (c)(2) of this section."

#### § 61.61 [Amended]

13. Amend § 61.61 as follows:

a. Paragraph (c) is amended by revising the words "polyvinyl chloride plant" to read "polyvinyl chloride (PVC) plant."

b. In paragraph (l), the first sentence is amended by revising the words "a least" to read "at least."

c. Paragraph (w)(3) is amended by revising the words "Test Method 21" to read "Method 21."

#### § 61.62 [Amended]

14. In § 61.62, paragraph (b) is amended by revising the words "0.2 g/kg (0.0002 lb/lb)" to read "0.2 g/kg (0.4 lb/ton)."

#### § 61.64 [Amended]

15. Amend § 61.64 as follows:

a. In paragraph (a)(2), the first sentence is amended by revising the words "0.02 g vinyl chloride/kg (0.00002 lb vinyl chloride/lb)" to read "0.02 g vinyl chloride/kg (0.04 lb vinyl chloride/ton)."

b. Paragraph (e)(2)(i) is amended by revising the words "2 g/kg (0.002 lb/lb)" to read "2 g/kg (4 lb/ton)."

c. Paragraph (e)(2)(ii) is amended by revising the words "0.4 g/kg (0.0004 lb/lb)" to read "0.4 g/kg (0.8 lb/ton)."

d. Paragraph (f)(2)(i) is amended by revising the words "2.02 g/kg (0.00202 lb/lb)" to read "2.02 g/kg (4.04 lb/ton)."

e. Paragraph (f)(2)(ii) is amended by revising the words "0.42 g/kg (0.00042 lb/lb)" to read "0.42 g/kg (0.84 lb/ton)."

#### § 61.65 [Amended]

16. Amend § 61.65 as follows:

a. In paragraph (a), the first sentence is amended by revising the words "Relief valve discharge" to read "Relief valve discharge (RVD)."

b. Paragraph (b)(8)(i)(D)(1) is amended by revising the words "sections 5.2.1. and 5.2.2. of Test Method 106 and in accordance with section 7.1 of Test Method 106" to read "sections 7.2.1 and 7.2.2 of Method 106 and in accordance with section 10.1 of Method 106."

c. In paragraph (b)(8)(i)(D)(2), the fourth sentence is amended by revising the words "maximum self life" to read "maximum shelf life."

d. In paragraph (b)(8)(i)(D)(2), the fifth sentence is amended by revising the words "section 7.3 of Test Method 106. The requirements in section 5.2.3.1. and 5.2.3.2. of Test Method 106" to read "Sections 8.1 and 9.2 of Method 106. The requirements in Sections 7.2.3.1 and 7.2.3.2 of Method 106."

e. In paragraph (c), the second sentence is amended by revising the

words "Test Method" to read "Method 106."

17. Amend § 61.67 by:

a. Revising § 61.67(g).  
b. In paragraph (h)(1) by revising "ASTM Method D-2267" to read "ASTM D2267-68, 78, or 88 or D4420-94."

The revisions read as follows:

**§ 61.67 Emission tests.**

(g) Unless otherwise specified, the owner or operator shall use the test methods in Appendix B to this part for each test as required by paragraphs (g)(1), (g)(2), (g)(3), (g)(4), and (g)(5) of this section, unless an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an alternative method, he may require the use of a reference method. If the results of the reference and alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be alternative is withdrawn. Whenever Method 107 is specified, and the conditions in Section 1.2, "Applicability" of Method 107A are met, Method 107A may be used.

(1) Method 106 is to be used to determine the vinyl chloride emissions from any source for which an emission limit is prescribed in § 61.62(a) or (b), § 61.63(a), or § 61.64(a)(1), (b), (c), or (d), or from any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in § 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii).

(i) For each run, one sample is to be collected. The sampling site is to be at least two stack or duct diameters downstream and one half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. For a rectangular cross section, an equivalent diameter is to be determined from the following equation:

$$\text{Equivalent diameter} = \frac{2(\text{length})(\text{width})}{(\text{length} + \text{width})}$$

The sampling point in the duct is to be at the centroid of the cross section. The sample is to be extracted at a rate proportional to the gas velocity at the sampling point. The sample is to contain a minimum volume of 50 liters (1.8 ft<sup>3</sup>) corrected to standard conditions and is to be taken over a period as close to 1 hour as practicable.

(ii) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The

average is to be computed on a time weighted basis.

(iii) For gas streams containing more than 10 percent oxygen, the concentration of vinyl chloride as determined by Method 106 is to be corrected to 10 percent oxygen (dry basis) for determination of emissions by using the following equation:

$$C_{b(\text{corrected})} = C_b (10.9)/(20.9 - \text{percent O}_2)$$

Where:

$C_{b(\text{corrected})}$  = The concentration of vinyl chloride in the exhaust gases, corrected to 10 percent oxygen.

$C_b$  = The concentration of vinyl chloride as measured by Method 106.

20.9 = Percent oxygen in the ambient air at standard conditions.

10.9 = Percent oxygen in the ambient air at standard conditions, minus the 10.0 percent oxygen to which the correction is being made.

Percent O<sub>2</sub> = Percent oxygen in the exhaust gas as measured by Method 3 of Appendix A of Part 60 of this chapter.

(iv) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions are to be determined using the following equation:

$$C_{BX} = \frac{C_b D_{VC} Q K (10^{-6})}{Z}$$

Where:

$C_{BX}$  = Vinyl chloride emissions, g/kg (lb/lb) product.

$C_b$  = Concentration of vinyl chloride as measured by Test Method 106, ppmv.

$D_{VC}$  = Density of vinyl chloride at standard conditions, 2.60 kg/m<sup>3</sup> (0.162 lb/ft<sup>3</sup>).

$Q$  = Volumetric flow rate as determined by Method 2 of Appendix A to Part 60 of this chapter, m<sup>3</sup>/hr (ft<sup>3</sup>/hr).

$K$  = Unit conversion factor, 1,000 g/kg (1 lb/lb).

$10^{-6}$  = Conversion factor for ppm.

$Z$  = Production rate, kg/hr (lb/hr).

(2) Method 107 or Method 601 (incorporated by reference as specified in § 61.18) is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream for which an emission limit is prescribed in § 61.65(b)(9)(i).

(3) When a stripping operation is used to attain the emission limits in § 61.64(e) and (f), emissions are to be determined using Method 107 as follows:

(i) The number of strippers (or reactors used as strippers) and samples and the types and grades of resin to be sampled are to be determined by the

Administrator for each individual plant at the time of the test based on the plant's operation.

(ii) Each sample is to be taken immediately following the stripping operation.

(iii) The corresponding quantity of material processed by each stripper (or reactor used as a stripper) is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraph (g)(3)(i) of this section.

(4) Where control technology other than or in addition to a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined as follows:

(i) Method 106 is to be used to determine atmospheric emissions from all of the process equipment simultaneously. The requirements of paragraph (g)(1) of this section are to be met.

(ii) Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream subject to the emission limit prescribed in § 61.64(e). Vinyl chloride mass emissions are to be determined using the following equation:

$$C_{BX} = \frac{C_{rvc} Q_{\text{water}} D_{\text{water}} Q K (10^{-6})}{Z}$$

Where:

$C_{BX}$  = Vinyl chloride emissions, g/kg (lb/lb) product in each inprocess wastewater stream.

$C_{rvc}$  = Concentration of vinyl chloride in wastewater, as measured by Method 107, ppmw.

$D_{\text{water}}$  = Density of wastewater, 1.0 kg/m<sup>3</sup> (0.0624 lb/ft<sup>3</sup>).

$Q_{\text{water}}$  = Wastewater flow rate, determined in accordance with a method which has been submitted to and approved by the Administrator, m<sup>3</sup>/hr (ft<sup>3</sup>/hr).

$K$  = Unit conversion factor, 1,000 g/kg (1 lb/lb).

$10^{-6}$  = Conversion factor for ppm.

$Z$  = Production rate, kg/hr (lb/hr), determined in accordance with a method which has been submitted to and approved by the Administrator.

(5) The reactor opening loss for which an emission limit is prescribed in § 61.64(a)(2) is to be determined. The number of reactors for which the determination is to be made is to be specified by the Administrator for each individual plant at the time of the



determination based on the plant's operation.

(i) Except as provided in paragraph (g)(5)(ii) of this section, the reactor opening loss is to be determined using the following equation:

$$C_{BX} = C_b \frac{V_R D_{VC} Q K (10^{-6})}{Z}$$

Where:

$C_{BX}$  = Vinyl chloride emissions, g/kg (lb/lb) product.

$C_b$  = Concentration of vinyl chloride, in ppmv, as determined by Method 106 or a portable hydrocarbon detector which measures hydrocarbons with a sensitivity of at least 10 ppmv.

$V_R$  = Capacity of the reactor, m<sup>3</sup> (ft<sup>3</sup>).

$D_{VC}$  = Density of vinyl chloride at standard conditions, 2.60 kg/m<sup>3</sup> (0.162 lb/ft<sup>3</sup>).

$K$  = Unit conversion factor, 1,000 g/kg (1 lb/lb).

$10^{-6}$  = Conversion factor for ppm.

$Z$  = Production rate, kg/hr (lb/hr).

(A) If Method 106 is used to determine the concentration of vinyl chloride ( $C_b$ ), the sample is to be withdrawn at a constant rate with a probe of sufficient length to reach the vessel bottom from the manhole.

Samples are to be taken for 5 minutes within 6 inches of the vessel bottom, 5 minutes near the vessel center, and 5 minutes near the vessel top.

(B) If a portable hydrocarbon detector is used to determine the concentration of vinyl chloride ( $C_b$ ), a probe of sufficient length to reach the vessel bottom from the manhole is to be used to make the measurements. One measurement will be made within 6 inches of the vessel bottom, one near the vessel center and one near the vessel top. Measurements are to be made at each location until the reading is stabilized. All hydrocarbons measured are to be assumed to be vinyl chloride.

(C) The production rate of polyvinyl chloride ( $Z$ ), which is the product of the average batch weight and the number of batches produced since the reactor was last opened to the atmosphere, is to be determined by a method submitted to and approved by the Administrator.

(ii) A calculation based on the number of evacuations, the vacuum involved, and the volume of gas in the reactor is hereby approved by the Administrator as an alternative method for determining reactor opening loss for postpolymerization reactors in the manufacture of bulk resins. Calculation methods based on techniques other than repeated evacuation of the reactor may

be approved by the Administrator for determining reactor opening loss for postpolymerization reactors in the manufacture of bulk resins.

(6) For a reactor that is used as a stripper, the emissions of vinyl chloride from reactor opening loss and all sources following the reactor used as a stripper for which an emission limit is prescribed in § 61.64(f) are to be determined. The number of reactors for which the determination is to be made is to be specified by the Administrator for each individual plant at the time of the determination based on the plant's operation.

(i) For each batch stripped in the reactor, the following measurements are to be made:

(A) The concentration of vinyl chloride in resin after stripping, measured according to paragraph (g)(3) of this section;

(B) The reactor vacuum at end of strip from plant instrument; and

(C) The reactor temperature at the end of strip from plant instrument.

(ii) For each batch stripped in the reactor, the following information is to be determined:

(A) The vapor pressure of water in the reactor at the end of strip from the following table:

#### METRIC UNITS

Reactor vapor temperature (°C)	H <sub>2</sub> O vapor pressure (mm Hg)	Reactor vapor temperature (°C)	H <sub>2</sub> O vapor pressure (mm Hg)	Reactor vapor temperature (°C)	H <sub>2</sub> O vapor pressure (mm Hg)
40	55.3	62	163.8	84	416.8
41	58.3	63	171.4	85	433.6
42	61.5	64	179.3	86	450.9
43	64.8	65	187.5	87	468.7
44	68.3	66	196.1	88	487.1
45	71.9	67	205.0	89	506.1
46	75.6	68	214.2	90	525.8
47	79.6	69	223.7	91	546.0
48	83.7	70	233.7	92	567.0
49	88.0	71	243.9	93	588.6
50	92.5	72	254.6	94	610.9
51	97.2	73	265.7	95	633.9
52	102.1	74	277.2	96	657.6
53	107.2	75	289.1	97	682.1
54	112.5	76	301.4	98	707.3
55	118.0	77	314.1	99	733.2
56	123.8	78	327.3	100	760.0
57	129.8	79	341.0		
58	136.1	80	355.1		
59	142.6	81	369.7		
60	149.4	82	384.9		
61	156.4	83	400.6		

## ENGLISH UNITS

Reactor vapor temperature (°F)	H <sub>2</sub> O vapor pressure (psia)	Reactor vapor temperature (°F)	H <sub>2</sub> O vapor pressure (psia)	Reactor vapor temperature (°F)	H <sub>2</sub> O vapor pressure (psia)
104	1.07	144	3.167	183	8.060
106	1.13	145	3.314	185	8.384
108	1.19	147	3.467	187	8.719
109	1.25	149	3.626	189	9.063
111	1.32	151	3.792	190	9.419
113	1.39	153	3.964	192	9.786
115	1.46	154	4.142	194	10.17
117	1.54	156	4.326	196	10.56
118	1.62	158	4.519	198	10.96
120	1.70	160	4.716	199	11.38
122	1.79	162	4.923	201	11.81
124	1.88	163	5.138	203	12.26
126	1.974	165	5.360	205	12.72
127	2.073	167	5.590	207	13.19
129	2.175	169	5.828	208	13.68
131	2.282	170	6.074	210	14.18
133	2.394	172	6.329	212	14.70
135	2.510	174	6.594		
136	2.632	176	6.866		
138	2.757	178	7.149		
140	2.889	180	7.443		
142	3.024	181	7.746		

(B) The partial pressure of vinyl chloride in reactor at end of strip from the following equation:

$$PP_{VC} = P_{ATM} - P_{RV} - P_W$$

Where:

Where:

$V_{RVS}$  = Reactor vapor space volume, m<sup>3</sup> (ft<sup>3</sup>)

$V_R$  = Reactor capacity, m<sup>3</sup> (ft<sup>3</sup>)

$V_W$  = Volume of water in reactor from recipe, m<sup>3</sup> (ft<sup>3</sup>)

$W_{PVC}$  = Dry weight of polyvinyl chloride in reactor from recipe, kg (lb)

$D_{PVC}$  = Typical density of polyvinyl chloride, 1,400 kg/m<sup>3</sup> (87.4 lb/ft<sup>3</sup>)

(iii) For each batch stripped in the reactor, the combined reactor opening loss and emissions from all sources following the reactor used as a stripper is to be determined using the following equation:

$$C_{BX} = K_1 (PPM_{VC}) + \frac{(PP_{VC})(V_{RVS})(R_{VC})}{(M_{VC})(T_R + K_T)}$$

Where:

$C_{BX}$  = Vinyl chloride emissions, g/kg (lb/lb) product.

$PPM_{VC}$  = Concentration of vinyl chloride in resin after stripping, ppmw

$K_1$  = Conversion factor from ppmw to units of emission standard, 0.001 (metric units) = 0.002 (English units)

$PP_{VC}$  = Partial pressure of vinyl chloride determined according to paragraph (g)(6)(ii)(B) of this section, mm Hg (psia)

$V_{RVS}$  = Reactor vapor space volume determined according to paragraph (g)(6)(ii)(C) of this section, m<sup>3</sup> (ft<sup>3</sup>)

$PP_{VC}$  = Partial pressure of vinyl chloride, mm Hg (psia)

$P_{ATM}$  = Atmospheric pressure at 0 °C (32 °F), 760 mm Hg (14.7 psia)

$P_{RV}$  = Absolute pressure of reactor vacuum, mm Hg (psia)

$P_W$  = Vapor pressure of water, mm Hg (psia)

(C) The reactor vapor space volume at the end of the strip from the following equation:

$$V_{RVS} = V_R - V_W - \frac{W_{PVC}}{D_{PVC}}$$

$R_{VC}$  = Ideal gas constant for vinyl chloride, 1,002 g-°K/(mm Hg-m<sup>3</sup>) [5.825 lb-°R/(psia-ft<sup>3</sup>)]

$M_{PVC}$  = Dry weight of polyvinyl chloride in reactor from recipe, kg (lb)

$T_R$  = Reactor temperature, °C (°F)

$K_T$  = Temperature conversion factor for °C to °K, 273 (°F to °R, 460)

(h)(1) Each piece of equipment within a process unit that can reasonably contain equipment in vinyl chloride service is presumed to be in vinyl chloride service unless an owner or operator demonstrates that the piece of equipment is not in vinyl chloride service. For a piece of equipment to be

considered not in vinyl chloride service, it must be determined that the percent vinyl chloride content can be reasonably expected not to exceed 10 percent by weight for liquid streams or contained liquid volumes and 10 percent by volume for gas streams or contained gas volumes, which also includes gas volumes above liquid streams or contained liquid volumes. For purposes of determining the percent vinyl chloride content of the process fluid that is contained in or contacts equipment, procedures that conform to the methods described in ASTM Method D-2267 (incorporated by

reference as specified in § 61.18) shall be used.

(2)(i) An owner or operator may use engineering judgment rather than the procedures in paragraph (h)(1) of this section to demonstrate that the percent vinyl chloride content does not exceed 10 percent by weight for liquid streams and 10 percent by volume for gas streams, provided that the engineering judgment demonstrates that the vinyl chloride content clearly does not exceed 10 percent. When an owner or operator and the Administrator do not agree on whether a piece of equipment is not in vinyl chloride service, however, the procedures in paragraph (h)(1) of this section shall be used to resolve the disagreement.

(ii) If an owner or operator determines that a piece of equipment is in vinyl chloride service, the determination can be revised only after following the procedures in paragraph (h)(1) of this section.

(3) Samples used in determining the percent vinyl chloride content shall be representative of the process fluid that is contained in or contacts the equipment.

#### § 61.68 [Amended]

18. Amend § 61.68 as follows:

a. Paragraph (c)(1) is amended by revising the words "sections 5.2.1. and 5.2.2. of Test Method 106 and in accordance with section 7.1 of Test Method 106" to read "Sections 7.2.1 and 7.2.2 of Method 106 and in accordance with Section 10.1 of Method 106."

b. In paragraph (c)(2), the fifth sentence is amended by revising the words "section 7.3 of Test Method 106. The requirements in section 5.2.3.1. and 5.2.3.2. of Test Method 106" to read "Sections 8.1 and 9.2 of Method 106. The requirements in Sections 7.2.3.1 and 7.2.3.2 of Method 106."

19. § 61.70(c) is revised as follows:

#### § 61.70 Reporting.

\* \* \* \* \*

(c) Unless otherwise specified, the owner or operator shall use the test methods in Appendix B to this part to conduct emission tests as required by paragraphs (c)(2) and (c)(3) of this section, unless an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an alternative method, he may require the use of a reference method. If the results of the reference and alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be alternative is withdrawn.

(1) The owner or operator shall include in the report a record of the vinyl chloride content of emissions for each 3-hour period during which average emissions are in excess of the emission limits in § 61.62(a) or (b), § 61.63(a), or § 61.64(a)(1), (b), (c), or (d), or during which average emissions are in excess of the emission limits specified for any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in § 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii). The number of 3-hour periods for which average emissions were determined during the reporting period shall be reported. If emissions in excess of the emission limits are not detected, the report shall contain a statement that no excess emissions have been detected. The emissions are to be determined in accordance with § 61.68(e).

(2) In polyvinyl chloride plants for which a stripping operation is used to attain the emission level prescribed in § 61.64(e), the owner or operator shall include in the report a record of the

vinyl chloride content in the polyvinyl chloride resin.

(i) If batch stripping is used, one representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping operation, and identified by resin type and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.

(ii) If continuous stripping is used, one representative sample of polyvinyl chloride resin is to be taken for each grade of resin processed or at intervals of 8 hours for each grade of resin which is being processed, whichever is more frequent. The sample is to be taken as the resin flows out of the stripper and identified by resin type and grade and the date and time the sample was taken. The corresponding quantity of material processed by each stripper over the time period represented by the sample during the 8-hour period, is to be recorded and identified by resin type and grade and the date and time it represents.

(iii) The vinyl chloride content in each sample is to be determined by Method 107 as prescribed in § 61.67(g)(3).

(iv) [Reserved]

(v) The report to the Administrator by the owner or operator is to include a record of any 24-hour average resin vinyl chloride concentration, as determined in this paragraph, in excess of the limits prescribed in § 61.64(e). The vinyl chloride content found in each sample required by paragraphs (c)(2)(i) and (c)(2)(ii) of this section shall be averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper(s) that calendar day, according to the following equation:

$$A_T = \frac{\sum_{i=1}^n P_{Gi} M_{Gi}}{Q_T} = \frac{P_{G1} M_{G1} + P_{G2} M_{G2} + \dots + P_{Gn} M_{Gn}}{Q_T}$$

Where:

$A_T$  = 24-hour average concentration of type T resin in ppm (dry weight basis).

$Q_T$  = Total production of type T resin over the 24-hour period, in kg (ton).

T = Type of resin.

$M_{Gi}$  = Concentration of vinyl chloride in one sample of grade  $G_i$  resin in ppm.

$P_{Gi}$  = Production of grade  $G_i$  resin represented by the sample, in kg (ton).

$G_i$  = Grade of resin: e.g.,  $G_1$ ,  $G_2$ ,  $G_3$ .

n = Total number of grades of resin produced during the 24-hour period.

The number of 24-hour average concentrations for each resin type determined during the reporting period shall be reported. If no 24-hour average resin vinyl chloride concentrations in excess of the limits prescribed in

§ 61.64(e) are measured, the report shall state that no excess resin vinyl chloride concentrations were measured.

(vi) The owner or operator shall retain at the source and make available for inspection by the Administrator for a minimum of 3 years records of all data needed to furnish the information required by paragraph (c)(2)(v) of this section. The records are to contain the following information:

(A) The vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, identified by the resin type and grade and the time and date of the sample, and

(B) The corresponding quantity of polyvinyl chloride resin processed by the stripper(s), identified by the resin type and grade and the time and date it represents.

(3) The owner or operator shall include in the report a record of any emissions from each reactor opening in excess of the emission limits prescribed in § 61.64(a)(2). Emissions are to be determined in accordance with

§ 61.67(g)(5), except that emissions for each reactor are to be determined. The number of reactor openings during the reporting period shall be reported. If emissions in excess of the emission limits are not detected, the report shall include a statement that excess emissions have not been detected.

(4) In polyvinyl chloride plants for which stripping in the reactor is used to attain the emission level prescribed in § 61.64(f), the owner or operator shall include in the report a record of the vinyl chloride emissions from reactor opening loss and all sources following the reactor used as a stripper.

(i) One representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping operation, and identified by resin type and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.

(ii) The vinyl chloride content in each sample is to be determined by Method 107 as prescribed in § 61.67(g)(3).

(iii) The combined emissions from reactor opening loss and all sources following the reactor used as a stripper are to be determined for each batch stripped in a reactor according to the procedure prescribed in § 61.67(g)(6).

(iv) The report to the Administrator by the owner or operator is to include a record of any 24-hour average combined reactor opening loss and emissions from all sources following the reactor used as a stripper as determined in this paragraph, in excess of the limits prescribed in § 61.64(f). The combined reactor opening loss and emissions from all sources following the reactor used as a stripper associated with each batch are to be averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin stripped in reactors that calendar day as follows:

For each type of resin (suspension, dispersion, latex, bulk, other), the following calculation is to be performed:

$$A_T = \frac{\sum_{i=1}^n P_{Gi} C_{Gi}}{Q_T} = \frac{P_{G1} C_{G1} + P_{G2} C_{G2} + \dots + P_{Gn} C_{Gn}}{Q_T}$$

Where:

$A_T$  = 24-hour average combined reactor opening loss and emissions from all sources following the reactor used as a stripper, in g vinyl chloride/kg (lb/ton) product (dry weight basis).

$Q_T$  = Total production of resin in batches for which stripping is completed during the 24-hour period, in kg (ton).

$T$  = Type of resin.

$C_{Gi}$  = Average combined reactor opening loss and emissions from all sources following the reactor used as a stripper of all batches of grade  $G_i$  resin for which stripping is completed during the 24-hour period, in g vinyl chloride/kg (lb/ton) product (dry weight basis) (determined according to procedure prescribed in § 61.67(g)(6)).

$P_{Gi}$  = Production of grade  $G_i$  resin in the batches for which  $C$  is determined, in kg (ton).

$G_i$  = Grade of resin: e.g.,  $G_1$ ,  $G_2$ ,  $G_3$ .

$n$  = Total number of grades of resin in batches for which stripping is completed during the 24-hour period.

The number of 24-hour average emissions determined during the reporting period shall be reported. If no

24-hour average combined reactor opening loss and emissions from all sources following the reactor used as a stripper in excess of the limits prescribed in § 61.64(f) are determined, the report shall state that no excess vinyl chloride emissions were determined.

\* \* \* \* \*

#### § 61.93 [Amended]

20. In § 61.93, paragraphs (b)(1)(I), (b)(1)(ii), and (b)(2)(I) are amended by revising the words "Reference Method" to read "Method" wherever they occur.

#### § 61.107 [Amended]

21. Amend § 61.107 as follows:

a. Paragraphs (b)(1)(I), (b)(1)(ii), and (b)(2)(I) are amended by revising the words "Reference Method" to read "Method" wherever they occur.

b. Paragraphs (b)(2)(iv) and (b)(5)(v) are amended by revising the words "method 114" to read "Method 114" wherever they occur.

c. Paragraph (b)(5)(iv) is amended by revising the words "table 2" to read "Table 2", wherever they occur.

#### § 61.110 [Amended]

22. In § 61.110, paragraph (c)(2) is amended by revising the words "1,000 megagrams" to read "1,000 megagrams (1,102 tons)."

#### § 61.123 [Amended]

23. Amend § 61.123 as follows:

a. Paragraph (d) is amended by revising the words "curies per metric ton" to read "curies per Mg or curies per ton" wherever they occur.

b. In paragraph (d), the fifth sentence is amended by revising the words "in metric tons" to read "in Mg (tons)."

#### § 61.125 [Amended]

24. Amend § 61.125 as follows:

a. Paragraph (a)(1) is amended by revising the words "Test Method 1 of Appendix A" to read "Method 1 of Appendix A."

b. Paragraph (a)(2) is amended by revising the words "Test Method 2 of Appendix A" to read "Method 2 of Appendix A."

c. Paragraph (a)(3) is amended by revising the words "Test Method 3 of Appendix A" to read "Method 3 of Appendix A."

d. Paragraph (a)(4) is amended by revising the words "Test Method 5 of



Appendix A" to read "Method 5 of Appendix A."

e. Paragraph (a)(5) is amended by revising the words "Test Method 111 of Appendix B" to read "Method 111 of Appendix B."

#### § 61.132 [Amended]

25. In § 61.132, paragraphs (b) and (b)(1) are amended by revising the words "Reference Method" to read "Method" wherever they occur.

#### § 61.133 [Amended]

26. In § 61.133, paragraphs (c) and (c)(1) are amended by revising the words "Reference Method" to read "Method" wherever they occur.

27. Amend § 61.139 as follows:

a. In paragraph (c)(1), the equation definitions for " $Q_{aj}$ " and " $Q_{bi}$ " are revised.

b. Paragraph (d)(2)(ii) is amended by revising the words "method 21" to read "Method 21" wherever they occur.

c. In paragraph (g)(1)(vi), the second sentence is amended by revising the words "Either follow section 7.1, "Integrated Bag Sampling and Analysis," or section 7.2, "Direct Interface Sampling and Analysis Procedure"" to read "Either the integrated bag sampling and analysis procedure or the direct interface procedure may be used."

d. Paragraph (g)(1)(vi)(A) is amended by revising the words "section 7.1" to read "the integrated bag sampling and analysis procedure."

e. In paragraph (g)(1)(vi)(B), the first sentence is amended by revising the words "section 7.2" to read "the direct

interface sampling and analysis procedure."

f. Paragraphs (h)(3), (h)(3)(ii), and (h)(4)(ii) are amended by revising the words "method 18" to read "Method 18" wherever they occur.

The revisions read as follows:

#### § 61.139 Provisions for alternative means for process vessels, storage tanks, and tar-intercepting sumps.

\* \* \* \* \*

(c) \* \* \*

(1) \* \* \*

$Q_{aj}$  = volumetric flow rate in vents after the control device, standard cubic meters/minute (scm/min) [standard cubic feet/minute (scf/min)].

$Q_{bi}$  = volumetric flow rate in vents before the control device, scm/min (scf/min).

\* \* \* \* \*

#### 61.155 [Amended]

28. In § 61.155, the section heading is amended by revising the words "asbestos-containing" to read "asbestos-containing."

#### § 61.162 [Amended]

29. Amend § 61.162 as follows:

a. Paragraph (a)(1) is amended by revising the words "2.5 Mg per year" to read "2.5 Mg (2.7 ton) per year."

b. Paragraph (b)(1) is amended by revising the words "0.4 Mg per year" to read "0.4 Mg (0.44 ton) per year."

30. Amend § 61.164 as follows:

a. Paragraph (c) is amended by revising the words "8.0 Mg per year" to read "8.0 Mg (8.8 ton) per year."

b. Paragraph (c) is amended by revising the words "1.0 Mg per year" to read "1.0 Mg (1.1 ton) per year."

c. In paragraph (c)(1), the first sentence is amended by revising the words "grams of elemental arsenic per kilogram" to read "grams of elemental arsenic per kilogram (pounds per ton)."

d. Paragraphs (c)(1) and (d)(3) are revised; the equation and definitions in paragraphs (c)(2) and (d)(5) are revised; and the definitions of the terms " $R_a$ " and " $T_i$ " in paragraph (d)(4) are revised.

e. Paragraph (d) is amended by revising the words "8.0 Mg per year" to read "8.0 Mg (8.8 ton) per year."

f. Paragraph (d) is amended by revising the words "1.0 Mg per year" to read "1.0 Mg (1.1 ton) per year."

g. Paragraph (d)(2)(i) is amended by revising the words "emission rate (g/h)" to read "emission rate, g/hr (lb/hr)."

h. Paragraph (d)(2)(ii)(D) is amended by revising the words "Section 4 of Method 5D" to read "Section 8.0 of Method 5D."

i. Paragraph (e)(1)(ii)(D) is amended by revising the words "Section 4 of Method 5D" to read "Section 8.0 of Method 5D."

The revisions read as follows:

#### § 61.164 Test methods and procedures.

\* \* \* \* \*

(c) \* \* \*

(1) Derive a theoretical uncontrolled arsenic emission factor ( $T_i$ ), based on material balance calculations for each arsenic-containing glass type (i) produced during the 12-month period, as follows:

$$T_i = (A_{bi} \times W_{bi}) + (A_{ci} \times W_{ci}) - B_{gi}$$

Where:

$T_i$  = The theoretical uncontrolled arsenic emission factor for each glass type (i), g/kg (lb/ton).

$A_{bi}$  = Fraction by weight of elemental arsenic in the fresh batch for each glass type (i).

$W_{bi}$  = Weight of fresh batch melted per unit weight of glass produced for each glass type (i), g/kg (lb/ton).

$A_{ci}$  = Fraction by weight of elemental arsenic in cullet for each glass type (i).

$W_{ci}$  = Weight of cullet melted per unit weight of glass produced for each glass type (i), g/kg (lb/ton).

$B_{gi}$  = Weight of elemental arsenic per unit weight of glass produced for each glass type (i), g/kg (lb/ton).

(2) \* \* \*

$$Y_i = \frac{T_i G_i}{K}$$

Where:

$Y_i$  = Theoretical uncontrolled arsenic emission estimate for the 12-month period for each glass type, Mg/year (ton/year).

$T_i$  = Theoretical uncontrolled arsenic emission factor for each type of glass (i) produced during the 12-

month period as calculated in paragraph (c)(1) of this section, g/kg (lb/ton).

$G_i$  = Quantity of each arsenic-containing glass type (i) produced during the 12-month period, kg/yr (ton/yr).

$K$  = conversion factor for unit consistency,  $10^6$  g/Mg (2,000 lb/ton).

\* \* \* \* \*

(d) \* \* \*

(3) Determine the actual uncontrolled arsenic emission factor ( $R_a$ ) as follows:



$$R_a = E_a \div P$$

Where:

$R_a$  = Actual uncontrolled arsenic emission factor, g/kg (lb/ton).

$E_a$  = Actual uncontrolled arsenic emission rate from paragraph (d)(2) of this section, g/hr (lb/hr).

$P$  = Rate of glass production, kg/hr (ton/hr), determined by dividing the weight of glass pulled from the furnace during the emission test by the number of hours taken to perform the test under paragraph (d)(2) of this section.

(4) \* \* \*

$R_a$  = Actual uncontrolled arsenic emission factor, determined in paragraph (d)(3) of this section, g/kg (lb/ton).

$T_i$  = Theoretical uncontrolled arsenic emission factor, g/kg (lb/ton), determined in paragraph (c)(1) of this section for the same glass type for which  $R_a$  was determined.

(5) \* \* \*

$$U = \frac{\sum_{i=1}^n (T_i \times F \times G_i)}{K}$$

Where:

$U$  = Uncontrolled arsenic emission rate for the 12-month period, Mg/yr (ton/yr).

$T_i$  = Theoretical uncontrolled arsenic emission factor for each type of glass (i) produced during the 12-month period as calculated in paragraph (c)(1) of this section, g/kg (lb/ton).

$F$  = The correction factor calculated in paragraph (d)(4) of this section.

$G_i$  = Quantity of each arsenic-containing glass type (i) produced during the 12-month period, kg/yr (ton/yr).

$n$  = Number of arsenic-containing glass types produced during the 12-month period.

$K$  = Conversion factor for unit consistency,  $10^6$  g/Mg (2,000 lb/ton).

\* \* \* \* \*

#### § 61.165 [Amended]

31. In § 61.165, paragraph (a)(7) is amended by revising the words "all records of maintenance" at the beginning of the sentence to read "All maintenance."

#### § 61.172 [Amended]

32. Amend § 61.172 as follows:

a. Paragraph (a) is amended by revising the words "75 kg/h" to read "75 kg/hr (165 lb/hr)."

b. Paragraph (c) is amended by revising the words "11.6 milligrams per dry standard cubic meter" to read "11.6 mg/dscm (0.0051 gr/dscf)."

#### § 61.174 [Amended]

33. In § 61.174, paragraph (f)(3) is amended by revising the equation definitions as follows:

#### § 61.174 Test methods and procedures.

\* \* \* \* \*

(f) \* \* \*

(3) \* \* \*

$R_c$  is the converter arsenic charging rate, kg/hr (lb/hr).

$A_c$  is the monthly average weight percent of arsenic in the copper matte charged during the month(%) as determined under paragraph (f)(2) of this section.

$A_l$  is the monthly average weight percent of arsenic in the lead matte charged during the month(%) as determined under paragraph (f)(2) of this section.

$W_{ci}$  is the total rate of copper matte charged to a copper converter during the month, kg (lb).

$W_{li}$  is the total rate of lead matte charged to a copper converter during the month, kg (lb).

$H_c$  is the total number of hours the copper converter department was in operation during the month (hr).

$n$  is the number of copper converters in operation during the month.

\* \* \* \* \*

#### § 61.192 [Amended]

34. In § 61.192, the first sentence is amended by revising the words "20 pCi/m<sup>2</sup>-s" to read "20 picocuries per square meter per second (pCi/(m<sup>2</sup>-sec)) (1.9 pCi/(ft<sup>2</sup>-sec))."

#### § 61.202 [Amended]

35. In § 61.202, the third sentence is amended by revising the words "20 pCi/m<sup>2</sup>-s" to read "20 pCi/(m<sup>2</sup>-sec) (1.9 pCi/(ft<sup>2</sup>-sec))."

#### § 61.204 [Amended]

36. In § 61.204, paragraph (b) is amended by revising the words "10 picocuries per gram (pCi/g)" to read "10 pCi/g (4500 pCi/lb)."

#### § 61.205 [Amended]

37–38. In § 61.205, paragraph (b)(2) is amended by revising the words "7,000 pounds" to read "3182 kg (7,000 lb)" wherever they occur.

#### § 61.208 [Amended]

39. Amend § 61.208 as follows:

a. Paragraph (a)(1)(iii) is amended by revising the words "quantity (in pounds) of phosphogypsum" are revised to read "quantity of phosphogypsum, in kilograms or pounds."

b. Paragraph (a)(1)(vi) is amended by revising the words "in pCi/g" to read "in pCi/g (pCi/lb)."

#### § 61.222 [Amended]

40. In § 61.222, paragraph (a) is amended by revising the words "20 pCi/m<sup>2</sup>-s" to read "20 pCi/(m<sup>2</sup>-sec) (1.9 pCi/(ft<sup>2</sup>-sec))."

#### § 61.241 [Amended]

41. In § 61.241, the definition of the term "In vacuum service" is amended by revising the words "5 kilopascals (kPa) below" to read "5 kilopascals (kPa) (0.7 psia) below."

#### § 61.242–11 [Amended]

42. In § 61.242–11, paragraph (c) is amended by revising the words "760 °C" to read "760 °C (1,400 °F)."

#### § 61.243–2 [Amended]

43. Amend § 61.243–2 as follows:

a. Paragraph (b)(2) is amended by revising the words "skip 1 of the" to read "skip one of the."

b. Paragraph (b)(3) is amended by revising the words "After 5 consecutive" to read "After five consecutive."

c. Paragraph (b)(3) is amended by revising the words "skip 3 of the quarterly" to read "skip three of the quarterly."

#### § 61.244 [Amended]

44. Amend § 61.244 as follows:

a. In paragraph (b)(1) by revising the words "emission limitation.limitation to test data" to read "emission limitation to test data."

b. By redesignating paragraph (b)(3) as paragraph (b)(2).

#### § 61.245 [Amended]

45–46. Amend § 61.245 as follows:

a. Paragraphs (b)(2), (b)(3), (b)(5), (c)(2), (c)(3), (e)(3), and (e)(4) are amended by revising the words "Reference Method" to read "Method" wherever they occur.

b. In paragraph (e)(3), the definitions of the terms " $H_T$ ", " $K$ ", " $C_i$ ", and " $H_i$ " are revised; and the equation and definitions in (e)(5) are revised as follows:

**§ 61.245 Test methods and procedures.**

(e) \* \* \*

(3) \* \* \*

$H_T$  = Net heating value of the sample, MJ/scm (BTU/scf); where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg (77 °F and 14.7 psi), but the standard temperature for determining the volume corresponding to one mole is 20 °C (68 °F).

$K$  = conversion constant,  $1.740 \times 10^7$  (g-mole) (MJ)/(ppm-scm-kcal) (metric units); or  $4.674 \times 10^8$  ((g-mole) (Btu)/(ppm-scf-kcal)) (English units)

$C_i$  = Concentration of sample component "i" in ppm, as measured by Method 18 of Appendix A to 40 CFR Part 60 and ASTM D2504-67, 77, or 88 (Reapproved 1993) (incorporated by reference as specified in § 61.18).

$H_i$  = net heat of combustion of sample component "i" at 25 °C and 760 mm Hg (77 °F and 14.7 psi), kcal/g-mole. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 (incorporated by reference as specified in § 61.18) if published values are not available or cannot be calculated.

\* \* \*

(5) \* \* \*

$$V_{\max} = K_1 + K_2 H_T$$

Where:

$V_{\max}$  = Maximum permitted velocity, m/sec (ft/sec).

$H_T$  = Net heating value of the gas being combusted, as determined in paragraph (e)(3) of this section, MJ/scm (Btu/scf).

$K_1$  = 8.706 m/sec (metric units)

= 28.56 ft/sec (English units)

$K_2$  = 0.7084 m<sup>4</sup>/(M-sec) (metric units)

= 0.087 ft<sup>4</sup>/(Btu-sec) (English units)

\* \* \*

**§ 61.252 [Amended]**

47. In § 61.252, paragraph (a) is amended by revising the words "20 pCi/m<sup>2</sup>-s" to read "20 pCi/(m<sup>2</sup>-sec) (1.9 pCi/(ft<sup>2</sup>-sec))."

**§ 61.270 [Amended]**

48. Amend § 61.270 as follows:

a. Paragraph (a) is revised.

b. Paragraph (e) is amended by revising the words "204.9 kPa" to read "204.9 kPa (29.72 psia)."

The revisions read as follows:

**§ 61.270 Applicability and designation of sources.**

(a) The source to which this subpart applies is each storage vessel that is

storing benzene having a specific gravity within the range of specific gravities specified in ASTM D836-84 for Industrial Grade Benzene, ASTM D835-85 for Refined Benzene-485, ASTM D2359-85a or 93 for Refined Benzene-535, and ASTM D4734-87 or 96 for Refined Benzene-545. These specifications are incorporated by reference as specified in § 61.18. See § 61.18 for acceptable versions of these methods.

\* \* \*

**§ 61.272 [Amended]**

49. Amend § 61.272 as follows:

a. In paragraph (c)(1)(i), the fourth sentence is amended by revising the words "816 °C" to read "816 °C (1,500 °F)."

b. Paragraph (d) is amended by revising the letter "O" in the words "40 CFR 60.18(e)" to read "40 CFR 60.18(e)."

**§ 61.301 [Amended]**

50. Amend § 61.301 as follows:

a. The definitions of the terms "Leak" and "Vapor-tight marine vessel" are amended by revising the words "method 21" to read "Method 21" wherever they occur.

b. In the definition of the terms "Vapor-tight tank truck or vapor-tight railcar", the second sentence is amended by revising the words "method 27 of part 60, appendix A" to read "Method 27 of Appendix A to 40 CFR part 60."

**§ 61.302 [Amended]**

51. Amend § 61.302 as follows:

a. In paragraph (d)(1), the third sentence is amended by revising the words "method 27 of part 60, appendix A" to read "Method 27 of Appendix A to 40 CFR Part 60."

b. In paragraph (e)(2), the second sentence is amended by revising the words "method 21 of part 60, appendix A" to read "Method 21 of Appendix A to 40 CFR Part 60."

c. In paragraph (e)(2)(ii)(B), fourth sentence, the words "method 21" are revised to read "Method 21 of Appendix A to 40 CFR Part 60."

d. In paragraph (h), the first sentence is amended by revising the words "method 27 of part 60, appendix A" to read "Method 27 of Appendix A to 40 CFR Part 60."

**§ 61.303 [Amended]**

52. In § 61.303, paragraphs (c), (c)(1), and (c)(2) are amended by revising the words "44 MW" to read "44 MW (150 × 10<sup>6</sup> BTU/hr)" wherever they occur.

**§ 61.304 [Amended]**

53. Amend § 61.304 as follows:

a. Paragraph (a)(4)(iii) is amended by revising the word "method" to read "Method."

b. In paragraph (a)(4)(iv), the first sentence is amended by revising the words "method 25A or method 25B" to read "Method 25A or Method 25B."

c. Paragraph (b) is amended by revising the words "a performance test according to method 22 of appendix A of this part, shall be performed to determine visible emissions. The observation period shall be at least 2 hours and shall be conducted according to method 22" to read "a performance test according to Method 22 of appendix A of 40 CFR part 60 shall be performed to determine visible emissions. The observation period shall be at least 2 hours."

54. Amend § 61.305 as follows:

a. Paragraphs (a), (b)(3), and (d) are amended by revising the words "44 MW" to read "44 MW (150 × 10<sup>6</sup> BTU/hr)" wherever they occur.

b. Paragraph (a)(3)(ii) is revised.

c. Paragraphs (b)(1), (b)(2), and (b)(3) are amended by revising the words "28 °C" to read "28 °C (50 °F)" wherever they occur.

The revisions read as follows:

**§ 61.305 Reporting and recordkeeping.**

(a) \* \* \*

(3) \* \* \*

(ii) The average combustion temperature of the steam generating unit or process heater with a design heat input capacity of less than 44 MW (150 × 10<sup>6</sup> BTU/hr), measured with the following frequency: at least every 2 minutes during a loading cycle if the total time period of the loading cycle is less than 3 hours, and every 15 minutes if the total time period of the loading cycle is equal to or greater than 3 hours. The measured temperature shall be averaged over the loading cycle.

\* \* \*

**§ 61.342 [Amended]**

55. Amend § 61.342 as follows:

a. In paragraph (a), the first sentence, the words "10 megagrams per year (Mg/yr)" are revised to read "10 megagrams per year (Mg/yr) (11 ton/yr)."

b. Paragraphs (a)(3), (b), (c), (c)(3)(i), (d), and (e) are amended by revising the words "10 Mg/yr" to read "10 Mg/yr (11 ton/yr)."

c. Paragraph (c)(3)(i) is amended by revising the words "0.02 liters per minute" to read "0.02 liters per minute (0.005 gallons per minute)."

d. Paragraph (c)(3)(ii)(B) is amended by revising the words "2.0 Mg/yr" to read "2.0 Mg/yr (2.2 ton/yr)."

e. Paragraph (d)(2)(1) is redesignated as paragraph (d)(2)(i).

f. In paragraph (d)(2)(i), the first sentence is amended by revising the words "1 Mg/yr" to read "1 Mg/yr (1.1 ton/yr)."

g. In paragraph (e)(2)(i), the first sentence is amended by revising the words "6.0 Mg/yr" to read "6.0 Mg/yr (6.6 ton/yr)."

#### § 61.348 [Amended]

56. Amend § 61.348 as follows:

a. In paragraph (b)(2)(i), the first sentence is amended by revising the words "1 Mg/yr" to read "1 Mg/yr (1.1 ton/yr)."

b. In paragraph (b)(2)(ii)(B), by revising the third sentence.

The revision reads as follows:

#### § 61.348 Standards: Treatment processes.

(b) \* \* \*

(2) \* \* \*

(ii) \* \* \*

(B) \* \* \* An enhanced biodegradation unit typically operates at a food-to-microorganism ratio in the range of 0.05 to 1.0 kg of biological oxygen demand per kg of biomass per day, a mixed liquor suspended solids ratio in the range of 1 to 8 grams per liter (0.008 to 0.7 pounds per liter), and a residence time in the range of 3 to 36 hours.

\* \* \*

#### § 61.349 [Amended]

57. In § 61.349, paragraph (a)(2)(i)(C) is amended by revising the words "760 °C" to read "760 °C (1,400 °F)."

#### § 61.354 [Amended]

58. In § 61.354, paragraph (c)(4) is amended by revising the words "44 megawatts (MW)" to read "44 MW (150 × 10<sup>6</sup> BTU/hr)."

58a. In paragraph (c)(5), "44 MW" is revised to read "44 MW (150 × 10<sup>6</sup> BTU/hr)."

#### § 61.355 [Amended]

59. Amend § 61.355 as follows:

a. Paragraphs (a)(3), (a)(4), (a)(4)(ii) are amended by revising the words "10 Mg/yr" to read "10 Mg/yr (11 ton/yr)" wherever they occur.

b. Paragraphs (a)(4), (a)(5), and (a)(5)(ii) are amended by revising the words "1 Mg/yr" to read "1 Mg/yr (1.1 ton/yr)" wherever they occur.

c. Paragraphs (c)(3)(ii)(F) and (c)(3)(ii)(H) are amended by revising the words "10 °C" to read "10 °C (50 °F)" wherever they occur.

d. Paragraph (c)(3)(v) is amended by revising the words "kg/yr" to read "kg/yr (lb/yr)" wherever they occur.

e. Paragraphs (e)(3), (e)(4), (f)(3), (f)(4)(iv), (f)(5), (i)(3)(iv), and (i)(4) are

amended by revising the definitions of the terms used in the equations; and (f)(4)(iii) and (i)(3)(iii) are amended by revising the equation and definitions of terms used in the equations.

f. Paragraphs (f)(4)(ii)(B), (f)(4)(ii)(C), (h)(1), (h)(2), (h)(3), (h)(5), (h)(6), (i)(2), (i)(3)(ii)(B), and (i)(3)(ii)(C) are amended by revising the word "method" to read "Method" wherever it occurs.

g. Paragraph (k)(7) is amended by revising the words "6.0 Mg/yr" to read "6.0 Mg/yr (6.6 ton/yr)."

The revisions read as follows:

#### § 61.355 Test methods, procedures, and compliance provisions.

\* \* \*

(e) \* \* \*

(3) \* \* \*

E<sub>b</sub> = Mass flow rate of benzene entering the treatment process, kg/hr (lb/hr).

K = Density of the waste stream, kg/m<sup>3</sup> (lb/ft<sup>3</sup>).

V<sub>i</sub> = Average volume flow rate of waste entering the treatment process during each run i, m<sup>3</sup>/hr (ft<sup>3</sup>/hr).

C<sub>i</sub> = Average concentration of benzene in the waste stream entering the treatment process during each run i, ppmw.

n = Number of runs.

10<sup>6</sup> = Conversion factor for ppmw.

(4) \* \* \*

E<sub>a</sub> = Mass flow rate of benzene exiting the treatment process, kg/hr (lb/hr).

K = Density of the waste stream, kg/m<sup>3</sup> (lb/ft<sup>3</sup>).

V<sub>i</sub> = Average volume flow rate of waste exiting the treatment process during each run i, m<sup>3</sup>/hr (ft<sup>3</sup>/hr).

C<sub>i</sub> = Average concentration of benzene in the waste stream exiting the treatment process during each run i, ppmw.

n = Number of runs.

10<sup>6</sup> = Conversion factor for ppmw.

(f) \* \* \*

(3) \* \* \*

E<sub>b</sub> = Mass flow rate of benzene entering the combustion unit, kg/hr (lb/hr).

K = Density of the waste stream, kg/m<sup>3</sup> (lb/ft<sup>3</sup>).

V<sub>i</sub> = Average volume flow rate of waste entering the combustion unit during each run i, m<sup>3</sup>/hr (ft<sup>3</sup>/hr).

C<sub>i</sub> = Average concentration of benzene in the waste stream entering the combustion unit during each run i, ppmw.

n = Number of runs.

10<sup>6</sup> = Conversion factor for ppmw.

(4) \* \* \*

(iii) \* \* \*

$$M_i = D_b V C (10^{-6})$$

Where:

M<sub>i</sub> = Mass of benzene emitted during run i, kg (lb).

V = Volume of air-vapor mixture exhausted at standard conditions, m<sup>3</sup> (ft<sup>3</sup>).

C = Concentration of benzene measured in the exhaust, ppmv.

D<sub>b</sub> = Density of benzene, 3.24 kg/m<sup>3</sup> (0.202 lb/ft<sup>3</sup>).

10<sup>6</sup> = Conversion factor for ppmv.

(iv) \* \* \*

E<sub>a</sub> = Mass flow rate of benzene emitted from the combustion unit, kg/hr (lb/hr).

M<sub>i</sub> = Mass of benzene emitted from the combustion unit during run i, kg (lb).

T = Total time of all runs, hr.

n = Number of runs.

(5) \* \* \*

R = Benzene destruction efficiency for the combustion unit, percent.

E<sub>b</sub> = Mass flow rate of benzene entering the combustion unit, kg/hr (lb/hr).

E<sub>a</sub> = Mass flow rate of benzene emitted from the combustion unit, kg/hr (lb/hr).

\* \* \*

(i) \* \* \*

(3) \* \* \*

(iii) \* \* \*

$$M_{aj} = \frac{K_i V_{aj}}{10^6} \left( \sum_{i=1}^n C_{ai} MW_i \right)$$

$$M_{bj} = \frac{K_i V_{bj}}{10^6} \left( \sum_{i=1}^n C_{bi} MW_i \right)$$

M<sub>aj</sub> = Mass of organics or benzene in the vent stream entering the control device during run j, kg (lb).

M<sub>bj</sub> = Mass of organics or benzene in the vent stream exiting the control device during run j, kg (lb).

V<sub>aj</sub> = Volume of vent stream entering the control device during run j, at standard conditions, m<sup>3</sup> (ft<sup>3</sup>).

V<sub>bj</sub> = Volume of vent stream exiting the control device during run j, at standard conditions, m<sup>3</sup> (ft<sup>3</sup>).

C<sub>ai</sub> = Organic concentration of compound i or the benzene concentration measured in the vent stream entering the control device as determined by Method 18, ppm by volume on a dry basis.

C<sub>bi</sub> = Organic concentration of compound i or the benzene concentration measured in the vent stream exiting the control device as determined by Method 18, ppm by volume on a dry basis.

MW<sub>i</sub> = Molecular weight of organic compound i in the vent stream, or the molecular weight of benzene, kg/kg-mol (lb/lb-mole).



n = Number of organic compounds in the vent stream; if benzene reduction efficiency is being demonstrated, then n=1.

$K_1$  = Conversion factor for molar volume at standard conditions (293 K and 760 mm Hg (527 R and 14.7 psia)) = 0.0416 kg-mol/m<sup>3</sup> (0.00118 lb-mol/ft<sup>3</sup>)

$10^{-6}$  = Conversion factor for ppmv.

(iv) \* \* \*

$E_a$  = Mass flow rate of organics or benzene entering the control device, kg/hr (lb/hr).

$E_b$  = Mass flow rate of organics or benzene exiting the control device, kg/hr (lb/hr).

$M_{aj}$  = Mass of organics or benzene in the vent stream entering the control device during run j, kg (lb).

$M_{bj}$  = Mass of organics or benzene in the vent stream exiting the control device during run j, kg (lb).

T = Total time of all runs, hr.

n = Number of runs.

(4) \* \* \*

R = Total organic reduction of efficiency or benzene reduction efficiency for the control device, percent.

$E_b$  = Mass flow rate of organics or benzene entering the control device, kg/hr (lb/hr).

$E_a$  = Mass flow rate of organic or benzene emitted from the control device, kg/hr (lb/hr).

\* \* \* \* \*

**§ 61.356 [Amended]**

60. Amend § 61.356 as follows:

a. Paragraph (b)(2)(i) is amended by revising the words "0.02 liters per minute" to read "0.02 liters (0.005 gallons) per minute."

b. Paragraph (b)(2)(i) is amended by revising the words "10 Mg/yr" to read "10 Mg/yr (11 ton/yr)."

c. Paragraph (b)(2)(ii) is amended by revising the words "2.0 Mg/yr" to read "2.0 Mg/yr (2.2 ton/yr)."

d. Paragraph (b)(4) is amended by revising the words "6.0 Mg/yr" to read "6.0 Mg/yr (6.6 ton/yr)."

e. Paragraphs (j)(4), (j)(5), and (j)(6) are amended by revising the words "28 °C" to read "28 °C (50 °F)" wherever they occur.

f. Paragraph (j)(6) is amended by revising the words "44 MW" to read "44 MW (150 × 106 BTU/hr)" wherever they occur.

g. Paragraph (j)(8) is amended by revising the words "6 °C" to read "6 °C (11 °F)" wherever they occur.

**§ 61.357 [Amended]**

61. Amend § 61.357 as follows:

a. Paragraphs (b) and (c) are amended by revising the words "1 Mg/yr" to read "1 Mg/yr (1.1 ton/yr)" wherever they occur.

b. Paragraphs (c) and (d) are amended by revising the words "10 Mg/yr" to read "10 Mg/yr (11 ton/yr)" wherever they occur.

c. Paragraphs (d)(7)(iv)(A), (d)(7)(iv)(B), and (d)(7)(iv)(C) are amended by revising the words "28 °C" to read "28 °C (50 °F)" wherever they occur.

d. Paragraph (d)(7)(iv)(C) is amended by revising the words "44 MW" to read "44 MW (150 × 106 BTU/hr)."

e. Paragraph (d)(7)(iv)(E) is amended by revising the words "6 °C" to read "6 °C (11 °F)."

62. In Part 61, Appendix B is amended by revising Methods 101, 101A, 102, 103, 104, 105, 106, 107, 107A, 108, 108A, 108B, 108C, and 111 to read as follows:

**Method 101—Determination of Particulate and Gaseous Mercury Emissions From Chlor-Alkali Plants (Air Streams)**

**Note:** This method does not include all of the specifications (e.g., equipment and supplies) and procedures (e.g., sampling and analytical) essential to its performance. Some material is incorporated by reference from methods in Appendix A to 40 CFR Part 60. Therefore, to obtain reliable results, persons using this method should have a thorough knowledge of at least the following additional test methods: Method 1, Method 2, Method 3, and Method 5.

**1.0 Scope and Application**

**1.1 Analytes.**

Analyte	CAS No.	Sensitivity
Mercury (Hg) .....	7439-97-6	Dependent upon recorder and spectrophotometer.

**1.2 Applicability.** This method is applicable for the determination of Hg emissions, including both particulate and gaseous Hg, from chlor-alkali plants and other sources (as specified in the regulations) where the carrier-gas stream in the duct or stack is principally air.

**1.3 Data Quality Objectives.** Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

**2.0 Summary of Method**

Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic iodine monochloride (ICl) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry.

**3.0 Definitions [Reserved]**

**4.0 Interferences**

**4.1 Sample Collection.** Sulfur dioxide (SO<sub>2</sub>) reduces ICl and causes premature depletion of the ICl solution.

**4.2 Sample Analysis.**

**4.2.1** ICl concentrations greater than  $10^{-4}$  molar inhibit the reduction of the Hg (II) ion in the aeration cell.

**4.2.2** Condensation of water vapor on the optical cell windows causes a positive interference.

**5.0 Safety**

**5.1 Disclaimer.** This method may involve hazardous materials, operations, and equipment. This test method does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method.

**5.2 Corrosive Reagents.** The following reagents are hazardous. Personal protective equipment and safe procedures are useful in preventing chemical splashes. If contact occurs, immediately flush with copious amounts of water for at least 15 minutes. Remove clothing under shower and decontaminate. Treat residual chemical burn as thermal burn.

**5.2.1 Hydrochloric Acid (HCl).** Highly toxic and corrosive. Causes severe damage to tissues. Vapors are highly irritating to eyes, skin, nose, and lungs, causing severe damage. May cause bronchitis, pneumonia, or edema of lungs. Exposure to concentrations of 0.13 to 0.2 percent can be lethal to humans in a few minutes. Provide ventilation to limit exposure. Reacts with metals, producing hydrogen gas.

**5.2.2 Nitric Acid (HNO<sub>3</sub>).** Highly corrosive to eyes, skin, nose, and lungs. Vapors cause bronchitis, pneumonia, or edema of lungs. Reaction to inhalation may be delayed as long as 30 hours and