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Link to consolidated regulation (PDF)

Link to Point in Time

Environmental Management Act

HAZARDOUS WASTE REGULATION

[includes amendments up to B.C. Reg. 243/2016, November 1, 2017]

Schedule 1

[en. B.C. Reg. 243/2016, App. 1, as am. by B.C. Reg. 195/2017, s. 1 (a).]

SCHEDULE 1

DIOXIN TOXICITY EQUIVALENCY FACTORS

Column 1 **Congeners**	Column 2 **Toxicity Equivalency Factor (TEF)**
2,3,7,8-tetrachlorodibenzo-p-dioxin	1.00000
1,2,3,7,8-pentachlorodibenzo-p-dioxin	1.00000
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0.10000
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0.10000
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0.10000
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	0.01000
octachlorodibenzo-p-dioxin	0.00030
2,3,7,8-tetrachlorodibenzofuran	0.10000
1,2,3,7,8-pentachlorodibenzofuran	0.03000
2,3,4,7,8-pentachlorodibenzofuran	0.30000
1,2,3,4,7,8-hexachlorodibenzofuran	0.10000
1,2,3,6,7,8-hexachlorodibenzofuran	0.10000
1,2,3,7,8,9-hexachlorodibenzofuran	0.10000
2,3,4,6,7,8-hexachlorodibenzofuran	0.10000
1,2,3,4,6,7,8-heptachlorodibenzofuran	0.01000
1,2,3,4,7,8,9-heptachlorodibenzofuran	0.01000
octachlorodibenzofuran	0.00030
PCB 77	0.00010
PCB 81	0.00030
PCB 126	0.10000
PCB 169	0.03000
PCB 105	0.00003
PCB 114	0.00003
PCB 118	0.00003
PCB 123	0.00003
PCB 156	0.00003
PCB 157	0.00003
PCB 167	0.00003
PCB 189	0.00003

Schedule 1.1

[en. B.C. Reg. 243/2016, App. 1.]

PAH Toxicity Equivalency Factors

Column 1 PAH	Column 2 Toxicity Equivalency Factor (TEF)
Benz(a)anthracene	0.10
Benzo(a)pyrene	1.00
Benzo(b)fluoranthene	0.10
Benzo(j)fluoranthene	0.10
Benzo(k)fluoranthene	0.10
Benzo(g,h,i)perylene	0.01
Chrysene	0.01
Dibenz(a,h)anthracene	1.00
Indeno(1,2,3,cd)pyrene	0.10

Schedule 1.2

[en. B.C. Reg. 132/92, s. 34; am. B.C. Reg. 319/2004, s. 2.]

Effluent Standards For Hazardous Waste Facilities

Column 1 Parameter	Column 2 Standard* for Discharges to the Environment or to Storm Sewers	Column 3 Standard* for Discharges Directed to Municipal or Industrial Effluent Treatment Works
Physical		
pH	6.5 to 8.5**	5.0 to 11.0**
Temperature	32°C	—
Total suspended solids	20	—
Toxicity (limit bioassay — 50% survival of Rainbow trout after 96 hours)	100% effluent	50% effluent
Inorganics		
Aluminum, dissolved	0.5	2.0
Ammonia, total (expressed as nitrogen)	2.0	—
Antimony, dissolved	0.25	0.5
Arsenic, dissolved	0.1	0.3
Barium, dissolved	1.0	2.5
Boron, dissolved	10.0	15.0
Cadmium, dissolved	0.05	0.1
Chromium, dissolved (hexavalent)	0.1	0.2
Chromium, total	0.5	1.0
Cobalt, dissolved	0.1	0.3
Copper, dissolved	0.1	0.3
Cyanide (weak acid dissociable)	0.1	0.2
Fluoride, dissolved	15	18
Lead, dissolved	0.1	0.3
Manganese, dissolved	0.5	1.0
Mercury, total	0.001	0.01
Molybdenum, dissolved	0.5	1.0
Nickel, dissolved	0.5	1.0
Selenium, dissolved	0.05	0.1

Tin, dissolved	0.5	1.0
Zinc, dissolved	0.2	0.5
Organics		
5 day Biochemical oxygen demand (BOD)	20	—
Dioxin TEQ	15 pg/L	15 pg/L
Oil	10	60
Phenol	0.2	0.5
Polychlorinated biphenyls, total	0.005	0.005
Total chlorinated phenol	0.006	0.05
Total organic halogens (as Cl)	1.0	1.0

* Maximum concentration or range in (mg/L) unless otherwise specified. Pg/L is the abbreviation for picograms per litre
** pH units are the negative log of the hydrogen ion concentration.
Note: Local municipal requirements may be more restrictive.

Schedule 2

[en. B.C. Reg. 132/92, s. 35; am. B.C. Reg. 319/2004, s. 44.]

Emission Standards for Thermal Treatment Facilities

Parameters	Maximum Concentration(1) (mg/m^3 unless otherwise indicated)	Averaging Period(2)	Monitoring Method(3)
Carbon monoxide	55	4-hr RA	C
Hydrogen chloride	50	8-hr RA	C
Hydrogen fluoride	4	A	A
Nitrogen oxides (as NO_2)	380	A	A
Opacity	5%	1-hr RA	C
Particulate matter	20	A	A
Sulphur dioxide	180	A	A
Total hydrocarbon (as methane)	32	A	A
Trace metals (4):			
Class 1 (lead, antimony, copper, manganese, vanadium, zinc)	3.6	A	A
Class II (arsenic, chromium, cobalt, nickel, selenium, tellurium)	0.7	A	A
Class III (thallium, cadmium, mercury)	0.15	A	A

NOTES:

(1) Concentrations are corrected to 11% oxygen and standard conditions of 20°C, 760 mm of mercury and dry basis.

(2) Averaging period codes:	RA	means rolling average which is the moving time period over which the continuous monitoring data is averaged.
	A	means as approved by a director.
(3) Monitoring method codes:	C	means continuous.
	A	means as approved by a director.

(4) The concentrations prescribed apply to each individual metal.

Schedule 3

[am. B.C. Regs. 319/2004, s. 2; 375/2008, s. 23.]

Waste Prohibited from Secure Disposal

1 Liquids.

2 Waste materials which contain free liquids.

3 Containers with

(a) liquids, or

(b) waste materials which contain free liquids.

4 Empty waste containers unless they are crushed, shredded or similarly reduced in volume to the maximum practical extent.

5 Ignitable wastes.

6 Reactive wastes.

7 Wastes which contain greater than 1% (by mass) of total organic carbon excluding

(a) any organic carbon naturally contained in any soil, and

(b) any organic carbon occurring in a substance which is not a hazardous waste.

8 Wastes which contain halogenated organic compounds in total concentrations greater than or equal to 1 000 mg/kg.

9 Wastes which when subjected to the Modified Leachate Extraction Procedure referenced in Part 2 of Schedule 4 produce an extract which contains one or more contaminants in Column 1 of Table 1 of Schedule 4 in concentrations equal to or greater than the concentration specified for each contaminant in Column II of the Table.

10 Radioactive wastes.

Schedule 4

[am. B.C. Regs. 132/92, s. 36; 214/2004, s. 9; 319/2004, s. 45.]

Analytical Methods

NOTE: This procedure is applicable to solids, liquids and mixtures of solids and liquids.

Part 1

Repealed. [B.C. Reg. 214/2004, s. 9 (a).]

Part 2 — Modified Leachate Extraction Procedure

(1) Sampling

1.1 For wastes with 0.5% solids weight by volume or greater, collect a sufficient amount of sample to provide approximately 100 g of solid material using techniques which ensure that the sample is representative of the waste.

1.2 If the waste has less than 0.5% solids weight by volume, collect at least 1 L of sample.

(2) Equipment

2.1 Sieve, 9.5 mm mesh opening, stainless steel or plastic material.

2.2 Stainless steel filtration unit, 142 mm diameter, minimum 1 L capacity, capable of sustaining a pressure of 5 kg/cm^2, applied to the material to be filtered.

2.3 Membrane filter, 142 mm diameter, 0.45 µm diameter pore size, made of synthetic organic material such as cellulose acetate, cellulose nitrate, nylon or polycarbonate and which is compatible with the leachate to be filtered. Teflon is recommended for organic constituents.

2.4 Glass fibre prefilter, 124 mm diameter 3 µm to 12 µm pore size range.

2.5 Vacuum filtration unit, 90 mm diameter.

2.6 Membrane filter 90 mm diameter as per Step 2.3.

2.7 Glass fibre filter 70 mm diameter as per Step 2.4.

2.8 Solid waste rotary extractor — a device that rotates the bottles end over end about a central axis through 360°, with a speed of 10 rpm. The dimensions of the box will depend on the needs of each laboratory (Figure 1).

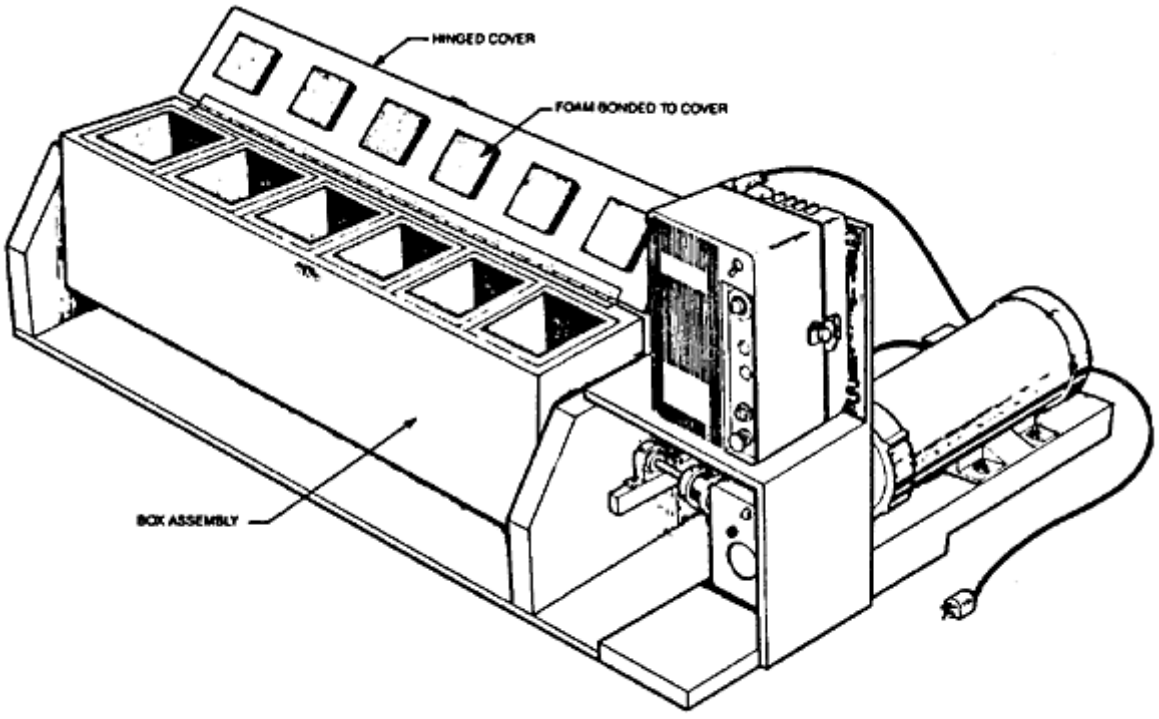

FIGURE 1
SOLID WASTE ROTARY EXTRACTOR

2.9 Structural Integrity Tester with a 3.18 cm diameter hammer weighing 0.33 kg and having a free fall of 15.24 cm (Figure 2).

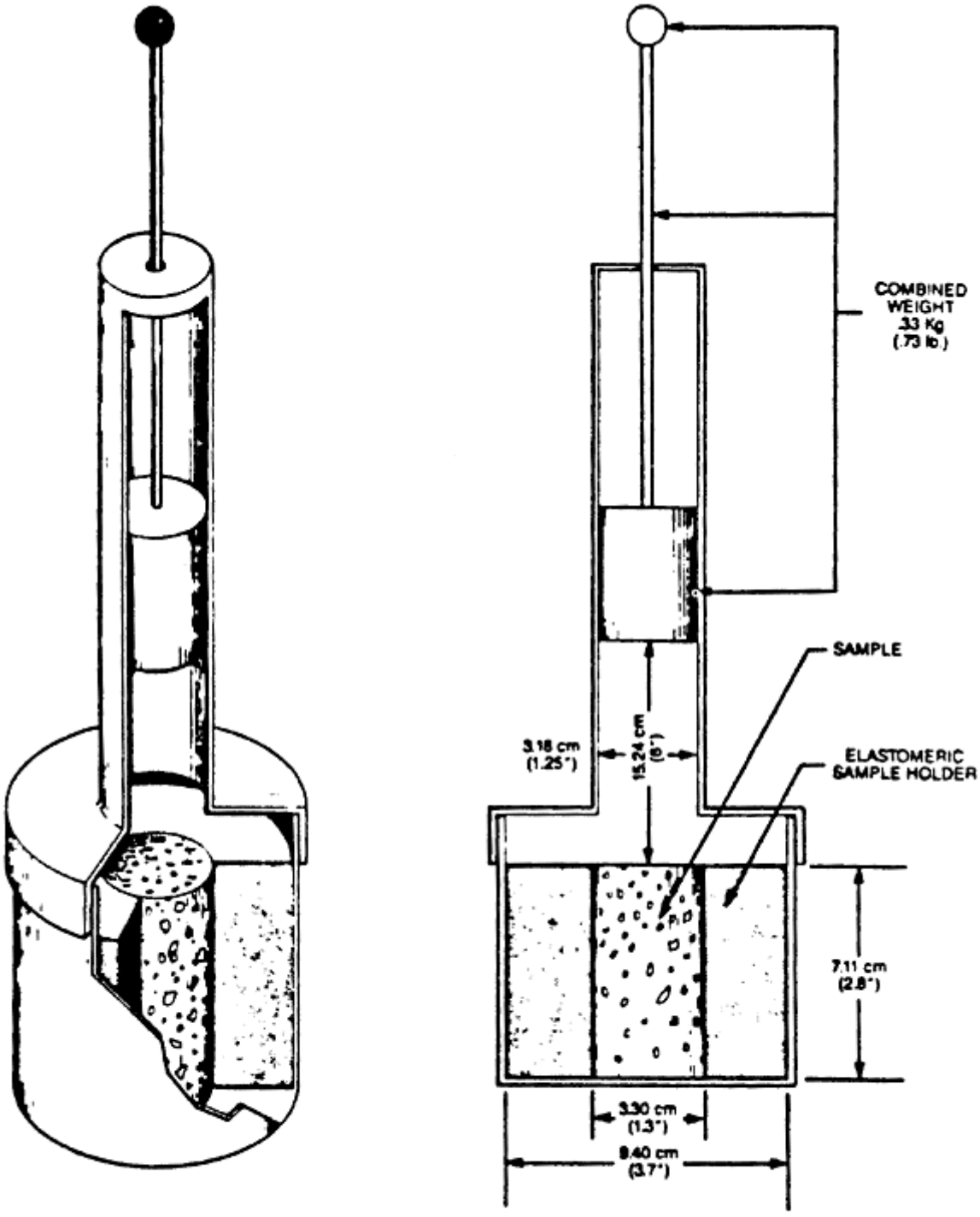

FIGURE 2
STRUCTURAL INTEGRITY TESTER

2.10 pH meter, with a readability of 0.01 pH unit and accuracy of ± 0.1 pH units.

2.11 Cylindrical bottles, wide mouth, 1 250 mL capacity, polyethylene or glass with Teflon-lined cap for inorganic constituents; glass with Teflon-lined cap or Teflon bottles for organic constituents.

2.12 Cleaning Procedure

All glassware and equipment that comes into contact with the sample must be cleaned in the following way before each use:

2.12.1 Wash with a non-phosphate detergent solution.

2.12.2 Rinse twice with tap water.

2.12.3 Rinse twice with reagent water.

2.12.4 Wash with 10% nitric acids.

2.12.5 Rinse several times with reagent water.

2.12.6 Store bottles filled with 10% nitric acids, until ready to use.

2.12.7 Rinse several times with reagent water before use.

2.12.8 Rinse clean oven dried bottles with methylene chloride, followed by methanol, for organic constituents.

(3) Reagents

3.1 Reagent water, Type IV (ASTM specification D1193).

3.2 Nitrogen gas, pre-purified, scrubbed through a molecular sieve.

(4) Separation procedure

If the sample is not a dry solid separate it into its component phases using the following procedure:

4.1 Determine the dry weight of the solids in the sample at 60°C, using a well homogenized sample. Use this weight to determine the amount of material to be filtered.

4.2 Assemble the filtration unit with a filter bed consisting of a 0.45 µm pore size membrane filter and a coarse glass fibre pre-filter upstream of the membrane filter (per manufacturer's instructions).

4.3 Select one or more blank filters from each batch of filters. Filter 50 mL portions of reagent water through each test filter and analyze the filtrate for the analytical parameters of interest. Note the volume required to reduce the blank values to acceptable levels.

4.4 Wash each filter used in the leach procedure with at least this predetermined volume of water. Filter under pressure until no water flows through the filtrate outlet.

4.5 Remove the moist filter bed from the filtration unit and determine its weight to the nearest ± 0.01 g.

4.6 Re-assemble the filtration unit, replacing the filter beds, as before.

4.7 Comminute the sample, with a mortar and pestle, to a size that will pass through the opening of the filtration unit (less than 9.5 mm).

4.8 Agitate the sample by hand and pour a representative aliquot part of the solid and liquid phases into the opening of the filtration unit. Filter a sufficient amount of the sample to provide at least 60 g of dry solid material.

4.9 Pressurize the reservoir very slowly with nitrogen gas by means of the regulating valve on the nitrogen gas cylinder, until liquid begins to flow freely from the filtrate outlet.

4.10 Increase the pressure in increments of 0.5 kg/cm^2 to a maximum of 5 kg/cm^2, as the flow diminishes. Continue filtration until the liquid flow ceases or the pressurizing gas begins to exit from the filtrate outlet of the filter unit.

4.11 De-pressurize the filtration unit slowly using the release valve on the filtration unit. Remove and weigh the solid material together with the filter bed to ± 0.01 g. Record the weight of the solid material.

4.12 Measure and record the volume and pH of the liquid phase. Store the liquid at 4°C under nitrogen until required in Step 5.8.

4.13 Discard the solid portion, if the weight is less than 0.5% (w/v) of the aliquot part taken and proceed to step 5.9. If not, proceed to Step 5.1.

Note: For mixtures containing coarse grained solids, where separation can be performed without imposing a 5 kg/cm^2 differential pressure, a vacuum filtration unit with a filter bed as per Step 4.2 may be used. Vacuum filtration must not be used if volatile organic compounds are to be analysed.

(5) Extraction procedure

5.1 Prepare a solid sample for extraction by crushing, cutting or grinding, to pass through a 9.5 mm mesh sieve. If the original sample contains both liquid and solid phases, use the solid material from Step 4.13. The structural integrity procedure, Step 6, must be used for monolithic wastes which are expected to maintain their structural integrity in a landfill, (e.g. some slags and treated solidified wastes).

Note: Do not allow the solid waste material to dry prior to the extraction step.

5.2 Determine the moisture content of the de-watered sample, by drying a suitable aliquot part to constant weight at 60°C in an oven. Discard the dried solid material.

5.3 Place the equivalent of 50 g dry weight of the de-watered undried material into a 1 250 mL wide mouth cylindrical bottle. Use additional bottles if a larger volume of leachate is required for the analysis.

5.4 Add 800 mL (less the moisture content of the sample in mL) of reagent water to the bottle.

5.5 Cap the bottle and agitate it in the rotary extractor for 1 hour.

5.6 Add enough reagent water at the end of the extraction period so that the total volume of liquid is 1 000 mL.

5.7 Separate the material into its component liquid and solid phases as described under the Separation Procedure, Step 4. Discard the solid portion.

Note: It may be necessary to centrifuge the suspension at high speed before filtration, for leachates containing very fine grained particles.

5.8 Calculate the amount of free liquid from Step 4.12 corresponding to 50 g of the dry solid material. Add this amount to the leachate from Step 5.7.

Note: If the analysis is not performed immediately, store separate aliquot parts of the leachate at 4°C, after adding appropriate preservatives for the analytical parameters of

interest.

5.9 If the weight of the solid portion in Step 4.1 was less than 0.5% (w/v), analyze the free liquid from Step 4.13; otherwise, analyze the combined solutions from Step 5.8 for contaminants listed in Table 1 of this Schedule that are likely to be present.

5.10 Report concentrations of contaminants in the combined leachate and the free liquid solution as mg/L.

(6) Structural integrity procedure

6.1 This procedure may be required prior to extraction for some samples as indicated in Step 5.1. It may be omitted for wastes with known high structural integrity.

6.2 Fill the sample holder with the material to be tested. If the sample of the waste is a large monolithic block, cut a portion from the block measuring 3.3 cm in diameter by 7.1 cm in length. For a treated waste (e.g. solidified waste) samples may be cast in a form with the above dimensions for the purposes of conducting this test. In such cases, the waste must be allowed to cure for 30 days prior to further testing.

6.3 Place the sample holder in the structural integrity tester, then raise the hammer to its maximum height and allow it to fall. Repeat this procedure 14 times.

6.4 Remove the material from the sample holder, and proceed to Step 5.2. If the sample has not disintegrated, it may be sectioned; alternatively use the entire sample (after weighing) and a sufficiently large bottle as the extraction vessel. The volume of reagent water to be initially added is 16 mL/g of dry sample weight. The maximum amount of 0.5 N acetic acid to be added is 4 mL/g of dry sample weight. The final volume of the leachate should be 20 mL/g of dry sample weight.

Part 3 — Free Liquid Test Procedure

(1) Sampling

Collect a minimum 100 g sample using techniques which ensure that the sample is representative of the waste.

(2) Equipment

2.1 Sieve, 9.5 mm mesh opening, stainless steel or plastic material.

2.2 Stainless steel filtration unit, 142 mm diameter, minimum 1 L capacity, capable of sustaining a pressure of 5 kg/cm^2, applied to the solution to be filtered.

2.3 Membrane filter, 142 mm diameter, 0.45 µm diameter pore size, made of synthetic organic material such as cellulose acetate, cellulose nitrate, nylon or polycarbonate and which is compatible with the leachate to be filtered. Teflon is recommended for organic constituents.

2.4 Glass fibre pre-filter, 124 mm diameter, 3 µm to 12 µm pore size range.

2.5 Vacuum filtration unit, 90 mm diameter.

2.6 Membrane filter 90 mm diameter as per Step 2.3.

2.7 Glass fibre filter 70 mm diameter as per Step 2.4.

(3) Separation procedure

Separate the sample into its component phases using the following procedure:

3.1 Assemble the filtration unit with a filter bed consisting of a 0.45 µm pore size membrane filter and a coarse glass fibre pre-filter upstream of the membrane filter (per manufacturer's instructions).

3.2 Comminute the sample, with a mortar and pestle, to a size that will pass through the opening of the filtration unit (less than 9.5 mm).

3.3 Agitate the sample by hand and pour a representative aliquot part of the solid and liquid phases into the opening of the filtration unit.

3.4 Pressurize the reservoir very slowly with nitrogen gas by means of the regulating valve on the nitrogen gas cylinder. Increase the pressure in increments of 0.5 kg/cm^2 per minute to a maximum of 5 kg/cm^2.

3.5 De-pressurize the filtration unit slowly using the release valve on the filtration unit.

3.6 Measure and record the volume of the liquid phase.

Table 1

Leachate Quality Standards

The item column gives sequential item numbers for the entries in this Table.

Item	Column 1 Contaminant	Column 2 Concentration in Waste Extract (mg/L)
1	Aldicarb	0.9
2	Aldrin + Dieldrin *(the concentration shown in column 2 is for aldrin and dieldrin together)*	0.07
3	Arsenic	2.5
4	Atrazine + N-dealkylated metabolites *(the concentration shown in column 2 is for atrazine and N-dealkylated metabolites together)*	0.5
5	Azinphos-methyl	2.0
6	Barium	100.0
7	Bendiocarb	4.0
8	Benzene	0.5
9	Benzo(a)pyrene	0.001
10	Boron	500.0
11	Bromoxynil	0.5
12	Cadmium	0.5
13	Carbaryl/1-Naphthyl-N-methyl carbamate	9.0
14	Carbofuran	9.0
15	Carbon tetrachloride	0.5
16	Chloramines	300.0
17	Chlordane	0.7

18	Chlorobenzene	8.0
19	Chlorpyrifos	9.0
20	Chromium	5.0
21	Copper	100
22	Cresols (total of all isomers)	200.0
23	Cyanazine	1.0
24	Cyanide	20.0
25	DDT (total of all isomers)	3.0
26	Diazinon	2.0
27	Dicamba	12.0
28	1,2-Dichlorobenzene	20.0
29	1,4-Dichlorobenzene	0.5
30	1,2-Dichloroethane	0.5
31	1,1-Dichloroethylene	1.4
32	Dichloromethane	5.0
33	2,4-Dichlorophenol	90.0
34	2,4-Dichlorophenoxyacetic acid	10.0
35	Diclofop-methyl	0.9
36	Dimethoate	2.0
37	2,4-Dinitrotoluene	0.13
38	Dinoseb	1.0
39	Diquat	7.0
40	Diuron	15.0
41	Endrin	0.02
42	Ethyl benzene	0.24
43	Ethyl methyl ketone	200.0
44	Fluoride	150.0
45	Glyphosate	28.0
46	Heptachlor + Heptachlor epoxide *(the concentration shown in column 2 is for Heptachlor and Heptachlor epoxide together)*	0.3
47	Hexachlorobenzene	0.13
48	Hexachlorobutadiene	0.5
49	Hexachloroethane	3.0
50	Lead	5.0
51	Lindane	0.4
52	Malathion	19.0
53	Mercury	0.1
54	Methoxychlor	90.0
55	Metolachlor	5.0
56	Metribuzin	8.0
57	1-Naphthyl-N-methyl carbamate	9.0
58	Nitrate	4500.0
59	Nitrate + Nitrite *(the concentration shown in column 2 is for Nitrate and Nitrite together)*	1000.0

60	Nitrilotriacetic acid	40
61	Nitrite	320.0
62	Nitrobenzene	2.0
63	Paraquat	1.0
64	Parathion	5.0
65	Parathion-methyl	0.7
66	Pentachlorophenol	6.0
67	Phorate	0.2
68	Picloram	19.0
69	Pyridine	5.0
70	Selenium	1.0
71	Silver	5.0
72	Simazine	1.0
73	Temephos	28.0
74	Terbufos	0.1
75	Tetrachloroethylene	3.0
76	Tetrachloromethane	0.5
77	2,3,4,6-Tetrachlorophenol	10.0
78	Toluene	2.4
79	Toxaphene	0.5
80	Triallate	23.0
81	Trichloroethylene	5.0
82	1,1,1-Trichloro-2,2-bis(p-methoxyphenyl) ethane	90.0
83	2,4,5-Trichlorophenol	400.0
84	2,4,6-Trichlorophenol	0.5
85	2,4,5-Trichlorophenoxyacetic acid	28.0
86	2-(2,4,5-Trichlorophenoxy) propionic acid	1.0
87	Trifluralin	4.5
88	Trihalomethanes (Total)	10.0
89	Uranium	10.0
90	Vinyl chloride	0.2
91	Xylenes	30.0
92	Zinc	500.0

Contents | **Parts 1 to 4** | **Parts 5 to 10** | **Schedules 1 to 4** | **Schedule 5** | **Schedule 6** | **Schedule 7** | **Schedule 8**