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Chapter NR 538

APPENDIX I

Table 1A

Category 1 ASTM Water Leach Test

Standard (mg/l)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
1.5	Aluminum (Al)	X	X	X	X
0.0012	Antimony (Sb)	X	X	X	X
0.005	Arsenic (As)	X	X	X	X
0.4	Barium (Ba)	X	X	X	X
0.0004	Beryllium (Be)	X	X	X	X
0.19	Boron (B)			X	X
0.0005	Cadmium (Cd)	X	X	X	X
125	Chloride (Cl)			X	X
0.010	Chromium, Tot. (Cr)	X	X	X	X
0.130	Copper (Cu)	X	X	X	X
0.040	Total Cyanide	X	X		X
0.8	Fluoride (F)	X	X		X
0.15	Iron (Fe)	X	X	X	X
0.0015	Lead (Pb)	X	X	X	X
.025	Manganese (Mn)	X	X	X	X
0.0002	Mercury (Hg)	X	X	X	X
0.05	Molybdenum (Mo)			X	X
0.020	Nickel (Ni)	X	X	X	X
2.0	Nitrite & Nitrate (NO_2+NO_3–N)			X	X
1.2	Phenol	X			X
0.010	Selenium (Se)	X	X	X	X
0.010	Silver (Ag)			X	X
125	Sulfate	X	X	X	X
0.0004	Thallium (Tl)	X	X	X	X
2.5	Zinc (Zn)	X	X	X	X

[1] As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials the department may modify the list of parameters required to be analyzed for and may establish standards on a material specific basis for additional parameters.

Note: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

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Table 1B

Category 1 Total Elemental Analysis

Standard (mg/kg)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
6.3	Antimony (Sb)	X	X	X	X
0.042	Arsenic (As)	X	X	X	X
1100	Barium (Ba)		X	X	X
0.014	Beryllium (Be)	X	X	X	X
1400	Boron (B)			X	X
7.8	Cadmium (Cd)			X	X
14.5	Chromium, Hex. (Cr)	X	X	X	X
50	Lead (Pb)		X	X	X
4.7	Mercury (Hg)			X	X
78	Molybdenum (Mo)			X	X
310	Nickel (Ni)			X	X
9400	Phenol				X
78	Selenium (Se)				X
9400	Silver (Ag)				X
9400	Strontium (Sr)				X
1.3	Thallium (Tl)	X	X	X	X
110	Vanadium (V)			X	X
4700	Zinc (Zn)			X	X
900	Acenaphthene	X		X	X
8.8	Acenaphthylene	X		X	X
5000	Anthracene	X		X	X
0.088	Benz(a)anthracene	X		X	X
0.0088	Benzo(a)pyrene	X		X	X
0.088	Benzo(b)fluoranthene	X		X	X
0.88	Benzo(ghi)perylene	X		X	X
0.88	Benzo(k)fluoranthene	X		X	X
8.8	Chrysene	X		X	X
0.0088	Dibenz(ah)anthracene	X		X	X
600	Fluoranthene	X		X	X
600	Fluorene	X		X	X
0.088	Indeno(123−cd)pyrene	X		X	X
8.8	1−methyl naphthalene	X		X	X
8.8	2−methyl naphthalene	X		X	X
600	Naphthalene	X		X	X
0.88	Phenanthrene	X		X	X
500	Pyrene	X		X	X

[1] As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials the department may modify the list of parameters required to be analyzed for and may establish standards on a material specific basis for additional parameters.

Note: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

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Table 2A

Category 2 and 3 ASTM Water Leach Test

Standard (mg/l)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other [1]
0.012	Antimony (Sb)	X	X	X	X
0.05	Arsenic (As)	X	X	X	X
4.0	Barium (Ba)	X	X	X	X
0.004	Beryllium (Be)	X	X	X	X
1.9	Boron (B)			X	X
0.005	Cadmium (Cd)	X	X	X	X
1250	Chloride (Cl)				X
0.10	Chromium, Tot. (Cr)	X	X	X	X
1.30	Copper (Cu)				X
0.40	Total Cyanide				X
8.0	Fluoride (F)	X			X
1.5	Iron (Fe)	X	X		X
0.015	Lead (Pb)	X	X	X	X
.25	Manganese (Mn)	X	X	X	X
0.002	Mercury (Hg)	X	X	X	X
0.20	Nickel (Ni)				X
20	Nitrite & Nitrate (NO_2+NO_3–N)				X
12	Phenol	X			X
0.10	Selenium (Se)	X	X	X	X
0.10	Silver (Ag)			X	X
1250	Sulfate			X	X
0.004	Thallium (Tl)			X	X
25	Zinc (Zn)				X

1 As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials the department may modify the list of parameters required to be analyzed for and may establish standards on a material specific basis for additional parameters.

Note: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

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Table 2B

Category 2 Total Elemental Analysis

Standard (mg/kg)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
21	Arsenic (As)	X	X	X	X
7	Beryllium (Be)	X	X	X	X
	Acenaphthene	X		X	X
	Acenaphthylene	X		X	X
	Anthracene	X		X	X
44	Benz(a)anthracene	X		X	X
4.4	Benzo(a)pyrene	X		X	X
44	Benzo(b)fluoranthene	X		X	X
	Benzo(ghi)perylene	X		X	X
	Benzo(k)fluoranthene	X		X	X
	Chrysene	X		X	X
4.4	Dibenz(ah)anthracene	X		X	X
	Fluoranthene	X		X	X
	Fluorene	X		X	X
44	Indeno(123−cd)pyrene	X		X	X
	1−methyl naphthalene	X		X	X
	2−methyl naphthalene	X		X	X
	Naphthalene	X		X	X
	Phenanthrene	X		X	X
	Pyrene	X		X	X
100[2]	Total PAHs	X		X	X

1 As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry slag, ferrous foundry slag and coal ash must be approved by the department prior to characterization. Also, for industrial byproducts not listed, department concurrence is necessary prior to classification as a category 2 industrial byproduct. For other materials the department may modify the list of parameters required to be analyzed for and may establish standards on a material specific basis for additional parameters. For these materials the total elemental analysis shall also include aluminum, antimony, barium, boron, cadmium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, phenol, selenium, silver, strontium, thallium, vanadium and zinc, unless otherwise approved by the department.

2 If total polyaromatic hydrocarbons exceed 100 mg/kg, department concurrence is necessary prior to classification as a category 2 industrial byproduct.

Note: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

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Table 3

Category 4 ASTM Water Leach Test

Standard (mg/l)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
0.03	Antimony (Sb)				X
0.25	Arsenic (As)				X
10	Barium (Ba)	X			X
0.02	Beryllium (Be)				X
4.8	Boron (B)			X	X
0.025	Cadmium (Cd)	X	X	X	X
2500	Chloride (Cl)				X
0.5	Chromium, Total (Cr)			X	X
6.5	Copper (Cu)				X
1	Total Cyanide				X
20	Fluoride (F)				X
3	Iron (Fe)	X	X		X
0.075	Lead (Pb)	X	X		X
0.5	Manganese (Mn)				X
0.01	Mercury (Hg)	X	X		X
0.5	Nickel (Ni)				X
50	Nitrite & Nitrate (NO_2+NO_3–N)				X
30	Phenol				X
0.25	Selenium (Se)			X	X
0.25	Silver (Ag)			X	X
2500	Sulfate			X	X
0.01	Thallium (Tl)				X
50	Zinc (Zn)				X

1 As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials the department may modify the list of parameters required to be analyzed for and may establish standards on a material specific basis for additional parameters.

Note: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

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Table 4

Beneficial Use Methods

	Industrial Byproduct Category				
	5	4	3	2	1
(1) Raw Material for Manufacturing a Product	X	X	X	X	X
(2) Waste Stabilization / Solidification	X	X	X	X	X
(3) Supplemental Fuel Source / Energy Recovery	X	X	X	X	X
(4) Landfill Daily Cover / Internal Structures	X	X	X	X	X
(5) Confined Geotechnical Fill (a) commercial, industrial or institutional building subbase (b) paved lot base, subbase & subgrade fill (c) paved roadway base, subbase & subgrade fill (d) utility trench backfill (e) bridge abutment backfill (f) tank, vault or tunnel abandonment (g) slabjacking material (h) soil and pavement base stabilization (i) controlled low strength material (flowable fill)		X	X	X	X
(6) Encapsulated Transportation Facility Embankment		X	X	X	X
(7) Capped Transportation Facility Embankment			X	X	X
(8) Unconfined Geotechnical Fill			X	X	X
(9) Unbonded Surface Course				X	X
(10) Bonded Surface Course				X	X
(11) Bonded Surface Course (Federal, state or municipal roadways)			X	X	X
(12) Decorative Stone				X	X
(13) Cold Weather Road Abrasive				X	X
Note: General beneficial use in accordance with s. NR 538.12 (3)					X

Note: Refer to s. NR 538.10 for description of each beneficial use