

7. REGULATIONS AND ADVISORIES

The international, national, and state regulations and guidelines regarding aluminum in air, water, and other media are summarized in Table 7- 1.

No MRLs for any duration of exposure for inhalation were determined for aluminum. An intermediate-duration oral exposure MRL of 2.0 mg/kg/day has been derived. This MRL is based on a NOAEL for neurotoxicity in mice (Golub et al. 1989). No acute- or chronic-duration oral MRLs were determined. EPA has not derived an RfD or RfC for aluminum (IRIS 1999).

The EPA has not classified aluminum for human carcinogenicity (IRIS 1999). The American Conference of Governmental Industrial Hygienists (ACGIH) has determined that aluminum is not classifiable as to its human carcinogenicity, and has assigned it to their group A4 (ACGIH 1996). The International Agency for Research on Cancer has assigned aluminum production to the Group 1 cancer classification (IARC 1987). The total body of evidence as reviewed by the IARC Work Group indicates that there is a causal relationship between human exposures to PAHs and other carcinogens in the aluminum production industry and human cancer, and that the evidence is sufficient enough to classify aluminum production as carcinogenic to humans (IARC 1984, 1987).

OSHA requires employers of workers who are occupationally exposed to aluminum to institute engineering controls and work practices to reduce and maintain employee exposure at or below permissible exposure limits (PELs). The employer must use engineering and work practice controls, if feasible, to reduce exposures to or below an 8-hour time-weighted average (TWA) of 15 mg/m³ for total aluminum dust or 5 mg/m³ for respirable fractions (OSHA 1974). Both ACGIH and NIOSH have established guideline values that range from 2 mg/m³ for soluble salts to 10 mg/m³ for aluminum or total dust (ACGIH 1996; NIOSH 1992). Various states have established regulations and guidelines based mainly on 8- or 24-hour average values.

The EPA regulates aluminum and certain aluminum compounds under the Clean Air Act (CAA). They are not, however, designated as hazardous air pollutants (HAPS). The two stationary source categories for which EPA has promulgated performance standards in an effort to control emissions to the atmosphere are primary and secondary aluminum plants (EPA 1977a, 1982a).

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Table 7-1. Regulations and Guidelines Applicable to Aluminum

Agency	Description	Information	References
INTERNATIONAL			
Guidelines:			
IARC	Carcinogenic classification (aluminum production)	Group 1 ^a	IARC 1984 IARC 1987
WHO	Drinking water guidelines aesthetic quality	0.2 mg/L	WHO 1984
NATIONAL			
Regulations:			
a. Air:			
OSHA	Occupational Safety and Health Standards—Limits for Air Contaminants (aluminum)	8-hour, TWA	
	Total dust	15 mg/m ³	29 CFR 1910.1000 OSHA 1974
	Respirable fraction	5 mg/m ³	
EPA OAR	Standards of Performance for New Stationary Sources		
	Addresses; primary aluminum reduction plants	Yes	40 CFR 60.4 EPA 1990a
	Priority List—Major source categories (secondary aluminum)	Yes	40 CFR 60.16 EPA 1982a
	Primary Aluminum Reduction Plants	Yes	40 CFR 60, Subpart S EPA 1977a
b. Water:			
EPA ODW	National Secondary Drinking Water Regulations—Secondary maximum contaminant levels	0.05 to 0.2 mg/L	40 CFR 143.3 EPA 1979a
	Monitoring	Yes	40 CFR 143.4 EPA 1979b
EPA OW	Designation of Hazardous Substances—List of hazardous substances (aluminum sulfate)	Yes	40 CFR 116.4 EPA 1978a
	Determination of Reportable Quantities for Hazardous Substances—RQ designated pursuant to Section 311 of the CWA aluminum sulfate	5,000 pounds (2,270 kg)	40 CFR 117.3 EPA 1985a
	EPA Administered Permit Programs: The National Pollution Discharge Elimination System—Primary industry category	Yes	40 CFR 122, App. A EPA 1983a
	Permit application testing requirements	Yes	40 CFR 122, App. D EPA 1983a
	Counties with unincorporated urbanized areas greater than 100,000, but less than 250,00—sludge treatment and disposal processes	Group A: total aluminum Hazardous substances: aluminum sulfate	40 CFR 122, App. I EPA 1990b

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	Electroplating Point Source Category—Applicability	Yes		40 CFR 413.10 EPA 1981d
	Inorganic Chemical Manufacturing Point Source Category— Aluminum chloride production subcategory-Applicability	Yes		40 CFR 415, Subpart A EPA 1982b
	Aluminum sulfate production subcategory-BPT, BAT, NSPS, PSES, PSNS	Yes		40 CFR 415, Subpart B EPA 1982c
	Aluminum fluoride production subcategory-BPT, BAT, NSPS, PSES, PSNS	Yes		40 CFR 415, Subpart W EPA 1982d
	Iron and Steel Manufacturing Point Source Category—Hot forming subcategory	Yes		40 CFR 420, Subpart G EPA 1982e
	Nonferrous Metals Manufacturing Point Source Category—Applicability	Yes		40 CFR 421.1 EPA 1984b
	Primary aluminum smelting subcategory—BAT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 421, Subpart B EPA 1984c
	anode and cathode paste plant wet air pollution control	8.31E-01	3.69E-01	
	anode contact cooling and briquette quenching	1.277	5.66E-01	
	anode bake plant wet air pollution control (closed top ring furnace)	26.420	11.720	
	anode bake plant wet air pollution control (open top ring furnace with spray tower only)	3.06E-01	1.36E-01	
	anode bake plant wet air pollution control (open top ring furnace with wet electrostatic precipitator and spray tower)	4.461	1.979	
	anode bake plant wet air pollution control (tunnel kiln)	6.953	3.084	
	cathode reprocessing (operated with dry potline scrubbing and not commingled with other precess or nonprocess waters)	273.200	122.600	
	cathode reprocessing (operated with dry potline scrubbing and commingled with other precess or nonprocess waters)	214.000	94.930	
	cathode reprocessing (operated with wet potline scrubbing)	0.000	0.000	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (*continued*)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	potline wet air pollution control (operated with cathode reprocessing and not commingled with other process or nonprocess water)	6.537	2.933	
	potline wet air pollution control (operated with cathode reprocessing and commingled with other process or nonprocess water)	5.120	2.271	
	potroom wet air pollution control	10.140	4.499	
	potline SO ₂ emissions wet air pollution control	8.194	3.634	
	degassing wet air pollution control	15.940	7.071	
	repair and pot soaking	0.000	0.000	
	direct chill casting contact cooling	8.120	3.602	
	continuous rod casting contact cooling	6.36E-01	2.82E-01	
	stationary casting or shot casting contact cooling	0.00	0.00	
	Primary aluminum smelting subcategory--NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
	anode and cathode paste plant wet air pollution control	0.000	0.000	
	anode contact cooling and briquette quenching	1.277	5.66E-01	
	anode bake plant wet air pollution control	0.000	0.000	
	cathode reprocessing (operated with dry potline scrubbing and not commingled with other process or nonprocess waters)	273.200	122.600	
	cathode reprocessing (operated with dry potline scrubbing and commingled with other process or nonprocess waters)	214.000	94.930	
	potline wet air pollution control	0.000	0.000	
	potroom wet air pollution control	0.000	0.000	
	potline SO ₂ emissions wet air pollution control	8.194	3.634	
	degassing wet air pollution control	0.000	0.000	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	pot repair and pot soaking	0.000	0.000	
	direct chill casting contact cooling	8.120	3.602	
	continuous rod casting contact cooling	6.36E-01	2.82E-01	
	stationary casting or shot casting contact cooling	0.00	0.000	
	Secondary aluminum smelting subcategory—Applicability	Yes		40 CFR 421, Subpart C EPA 1984d
	Secondary aluminum smelting subcategory—BAT and NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
	scrap drying wet air pollution	mg/kg (lbs./10 ⁶ lbs)	0.000	
	scrap screening and milling	0.000	0.000	
	BAT-dross washing	66.410	29.450	
	NSPS-dross washing	0.000	0.000	
	demagging wet air pollution control	4.711	2.090	
	deaquering wet air pollution control	2.035	9.03E-01	
	direct chill casting contact cooling	8.120	3.602	
	ingot conveyor casting contact cooling (when chlorine demagging wet air pollution control is not practiced on-site)	4.09E-01	1.82E-01	
	ingot conveyor casting contact cooling (when chloride demagging wet air pollution control is practiced on-site)	0.000	0.000	
	stationary casting contact cooling	0.000	0.000	
	shot casting contact cooling	0.000	0.000	
	Metal Finishing Point Source Category— Metal finishing subcategory	Yes		40 CFR 433, Subpart A EPA 1983b
	Ore Mining and Dressing Point Source Category— Aluminum ore subcategory— BPT, BA, and NSPS	Yes		40 CFR 440, Subpart B EPA 1982f
	Metal Molding and Casting Point Source Category—General definitions	Yes		40 CFR 464.02 EPA 1985b
	Aluminum casting subcategory Applicability	Yes		40 CFR 464, Subpart A EPA 1985c

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	Coil Coating Point Source Category— Aluminum basis material subcategory—	<u>1-day Max.</u> mg/m ² (lbs./10 ⁶ ft ²)	<u>Monthly Avg.</u>	40 CFR 465, Subpart C EPA 1982g
	BPT	15.3 6.26 (3.14)	(1.28)	
	BAT	4.49 1.84 (0.92)	(0.38)	
	NSPS	1.44 1.59 (0.30)	(0.121)	
	Can making subcategory	<u>1-day Max.</u> (g [lbs]/10 ⁶ cans manufactured)	<u>Monthly Avg.</u>	40 CFR 465, Subpart D EPA 1982g
	BPT	1382.45 (3.048)	688.00 (1.517)	
	BAT	539.48 (1.189)	268.48 (0.592)	
	NSPS	408.95 (0.902)	203.52 (0.449)	
	Porcelain Enameling Point Source Category—	<u>1-day Max.</u> mg/m ² (lbs./10 ⁶ ft ²)	<u>Monthly Avg.</u>	40 CFR 466, Subpart A EPA 1982h
	Steel basis material subcategory— BPT metal preparation	182.20 (37.22)	74.47 (15.26)	
	BPT coating operations	38.87 (7.55)	15.07 (3.09)	
	BAT metal preparation	182.00 (37.32)	78.48 (15.26)	
	BAT coating operations	5.74 2.35 (1.18)	(0.84)	
	NSPS metal preparation	30.3 12.4 (6.21)	(2.54)	
	NSPS coating operations	3.82 1.56 (0.78)	(0.84)	
	Cast iron basis material subcategory—	<u>1-day Max.</u> mg/m ² (lbs./10 ⁶ ft ²)	<u>Monthly Avg.</u>	40 CFR 466, Subpart B EPA 1982h
	BPT	13.86 (2.84)	8.32 (1.71)	
	BAT	5.74 (1.18)	2.35 (0.48)	
	NSPS	3.82 (0.78)	1.56 (0.32)	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	Aluminum basis material subcategory—	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 466, Subpart C EPA 1982i
	BPT and BAT metal preparation	mg/m ² (lbs./10 ³ ft ²) 176.98 (36.25)	72.35 (14.82)	
	BPT coating operations	68.44 (14.02)	27.98 (5.73)	
	BAT coating operations	5.74 2.35 (1.18)	(0.48)	
	NSPS metal preparation	29.45 (6.03)	12.06 (2.47)	
	NSPS coating operations	3.82 1.56 (0.78)	(0.32)	
	Copper basis material subcategory	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 466, Subpart D EPA 1982j
	NSPS metal preparation	mg/m ² (lbs./10 ³ ft ²) 50.97 (10.44)	20.66 (4.27)	
	NSPS coating operations	3.82 1.56 (0.78)	(0.32)	
	Aluminum Forming Point Source Category— Applicability; monitoring and reporting requirements; and removal allowance for pretreatment standards	Yes		40 CFR 467.01-.05 EPA 1983c
	Rolling with neat oils subcategory—BPT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 467, Subpart A EPA 1983d
	core with an annealing furnace scrubber	mg/off-kg (lbs./10 ³ off-lbs.) 5.25E-01	2.57E-01	
	core without an annealing furnace scrubber	3.56E-01	1.74E-01	
	continuous sheet casting spent lubricant	1.27E-02	6.30E-03	
	solution heat treatment contact cooling water	49.55	24.66	
	cleaning or etching bath	1.15	5.73E-01	
	cleaning or etching rinse	89.46	44.52	
	cleaning or etching scrubber liquor	102.24	50.88	
	BAT for:	5.25E-01	2.57E-01	
	core with an annealing furnace scrubber			
	core without an annealing furnace scrubber	3.56E-01	1.74E-01	
	continuous sheet casting spent lubricant	1.27E-02	6.30E-03	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	solution heat treatment contact cooling water	13.10	6.518	
	cleaning or etching bath	1.151	5.73E-01	
	cleaning or etching rinse	8.944	4.45	
	cleaning or etching scrubber liquor	12.43	6.186	
	NSPS for: core with an annealing furnace scrubber	4.99E-01	2.21E-01	
	core without an annealing furnace scrubber	3.38E-01	1.50E-01	
	continuous sheet casting spent lubricant	1.20E-02	5.30E-03	
	solution heat treatment contact cooling water	12.45	5.52	
	cleaning or etching bath	1.094	4.85E-01	
	cleaning or etching rinse	8.50	3.70	
	cleaning or etching scrubber liquor	11.81	5.24	
	Rolling with emulsions subcategory— BPT for: core	<u>1-day Max.</u> mg/off-kg (lbs./10 ⁶ off-lbs.) 8.4E-01	<u>Monthly Avg.</u> 4.16E-01	40 CFR 467, Subpart B EPA 1983e
	direct chill casting contact cooling water	8.55	4.26	
	solution heat treatment contact cooling water	49.55	24.66	
	cleaning or etching bath	1.15	5.73E-01	
	cleaning or etching rinse	89.46	44.52	
	cleaning or etching scrubber liquor	102.24	50.88	
	BAT for: core	<u>1-day Max.</u> mg/off-kg (lbs./10 ⁶ off-lbs.) 8.4E-01	<u>Monthly Avg.</u> 4.2E-01	
	direct chill casting contact cooling water	8.55	4.26	
	solution heat treatment contact cooling water	13.10	6.52	
	cleaning or etching bath	1.15	5.73E-01	
	cleaning or etching rinse	8.95	4.45	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	cleaning or etching scrubber liquor	12.43	6.19	
	NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	8.0E-01	3.5E-01	
	direct chill casting contact cooling water	8.12	3.60	
	solution heat treatment contact cooling water	12.45	5.52	
	cleaning or etching bath	1.094	4.85E-01	
	cleaning or etching rinse	8.50	3.77	
	cleaning or etching scrubber liquor	11.81	5.24	
	Extrusion subcategory- BPT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 467, Subpart C EPA 1983f
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	2.34	1.16	
	extrusion press leakage	9.51	4.73	
	direct chill casting contact cooling water	8.55	4.26	
	press heat treatment contact cooling water	49.55	24.66	
	solution heat treatment contact cooling water	49.55	24.66	
	cleaning or etching bath	1.15	5.73E-01	
	cleaning or etching rinse	102.24	50.88	
	degassing scrubber liquor	16.78	8.35	
	BAT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	2.19	1.09	
	extrusion press leakage	9.51	4.73	
	direct chill casting contact cooling water	8.55	4.26	
	press heat treatment contact cooling water	13.10	6.52	
	solution heat treatment contact cooling water	13.10	6.52	
	cleaning or etching bath	1.15	5.8E-01	
	cleaning or etching rinse	25.00	13.00	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (*continued*)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	cleaning or etching scrubber liquor	12.43	6.19	
	NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	2.07	9.2E-01	
	extrusion press leakage	1.82	8.1E-01	
	direct chill casting contact cooling water	8.12	3.60	
	press heat treatment contact cooling water	12.45	5.52	
	solution heat treatment contact cooling water	12.45	5.52	
	cleaning or etching bath	1.094	1.79	
	cleaning or etching rinse	8.5	3.77	
	cleaning or etching scrubber liquor	11.81	5.24	
	Forging subcategory--NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 467, Subpart D EPA 1983g
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	3.05E-01	1.35E-01	
	forging scrubber liquor	5.76E-01	2.56E-01	
	solution heat treatment contact cooling water	12.45	5.52	
	cleaning or etching bath	1.094	4.85E-01	
	cleaning or etching rinse	8.85	3.77	
	cleaning or etching scrubber liquor	11.81	5.24	
	Drawing with neat oils subcategory--BPT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 467, Subpart E EPA 1983h
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	3.20E-01	1.60E-01	
	continuous rod casting spent lubricant	1.27E-02	6.30E-03	
	continuous rod casting contact cooling water	10.00	4.98	
	solution heat treatment contact cooling water	49.55	24.66	
	cleaning or etching bath	1.15	5.70E-01	
	cleaning or etching rinse	89.46	14.52	
	cleaning or etching scrubber liquor	102.2450.88		

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	BAT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	3.21E-01	1.60E-01	
	continuous rod casting spent lubricant	1.27E-02	6.30E-03	
	continuous rod casting contact cooling water	1.25	6.21E-01	
	solution heat treatment contact cooling water	13.10	6.52	
	cleaning or etching bath	1.15	5.63E-01	
	cleaning or etching rinse	8.94	4.51	
	cleaning or etching scrubber liquor	12.43	6.19	
	NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
		mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	3.04E-01	1.35E-01	
	continuous rod casting spent lubricant	2.00E-03	6.00E-03	
	continuous rod casting contact cooling water	1.19	5.26E-01	
	solution heat treatment contact cooling water	12.45	5.52	
	cleaning or etching bath	1.09	4.85E-01	
	cleaning or etching rinse	8.50	3.77	
	cleaning or etching scrubber liquor	11.81	5.24	
	Drawing with emulsions or soaps subcategory	<u>1-day Max.</u>	<u>Monthly Avg.</u>	40 CFR 467, Subpart F EPA 1983i
	BPT for:	mg/off-kg (lbs./10 ⁶ off-lbs.)		
	core	3.00	1.50	
	continuous rod casting spent lubricant	1.30E-02	7.00E-03	
	continuous rod casting contact cooling water	10.00	4.98	
	solution heat treatment contact cooling water	49.55	24.66	
	cleaning or etching bath	1.15	5.73E-01	
	cleaning or etching rinse	89.46	44.52	
	cleaning or etching scrubber liquor	102.24	50.88	

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (*continued*)

Agency	Description	Information		References
<u>NATIONAL (cont.)</u>				
	BAT for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
	core	mg/off-kg (lbs./10 ⁶ off-lbs.)		
		3.00	1.49	
	continuous rod casting spent lubricant	1.30E-02	6.30E-03	
	continuous rod casting contact cooling water	1.25	6.20E-01	
	solution heat treatment contact cooling water	13.10	6.52	
	cleaning or etching bath	1.15	5.70E-01	
	cleaning or etching rinse	8.95	4.45	
	NSPS for:	<u>1-day Max.</u>	<u>Monthly Avg.</u>	
	core	mg/off-kg (lbs./10 ⁶ off-lbs.)		
		2.850	1.27	
	continuous rod casting spent lubricant	1.2E-02	5.3E-03	
	continuous rod casting contact cooling water	1.18	5.26E-01	
	solution heat treatment contact cooling water	12.45	5.52	
	cleaning or etching bath	1.09	4.9E-01	
	cleaning or etching rinse	8.50	3.77	
	cleaning or etching scrubber liquor	1.18	5.24	
c. Food: EPA	Tolerances and Exemptions from Tolerances for Pesticide Chemicals In or On Raw Agricultural Commodities—Specific tolerances aluminum phosphide; tolerances for residues	0.1 ppm		40 CFR 180.225 EPA 1977b
	Exemptions from tolerances aluminum hydroxide (diluent carrier) aluminum oxide (diluent)	Yes		40 CFR 180.1001 EPA 1971
	Tolerances for Pesticides in Animal Feeds—Feed additives permitted in animal feed aluminum phosphide	Yes		40 CFR 186.200 EPA 1977c
	Tolerances for Pesticides in Foods—Food additives permitted in food for human consumption aluminum phosphide	Yes		40 CFR 185.200 EPA 1988a

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Agency	Description	Information	References
NATIONAL (cont.)			
d. Other:			
EPA OAR	Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings—Standards for the control of residual radioactive materials from inactive uranium processing sites aluminum phosphide	Yes	40 CFR 192, App. I EPA 1995c
EPA OSW	Identification and Listing of Hazardous Waste Hazardous waste from non-specific sources—hazardous waste codes for aluminum Hazardous waste from specific sources—hazardous waste codes for primary aluminum Discarded commercial chemical products, off-species, container residues, and spill residues—hazardous waste codes: primary aluminum aluminum phosphide	F006 and F019 K008 K008 P006	40 CFR 261.31 EPA 1981a 40 CFR 261.32 EPA 1981b 40 CFR 261.33 EPA 1980
	Identification and Listing of Hazardous Waste—Hazardous constituents; hazardous waste code P006 aluminum phosphide		40 CFR 261, App. VIII EPA 1988b
	Waste excluded under 40 CFR 260.20 and 260.22 (aluminum)	Yes	40 CFR 261, App. IX EPA 1984a
	Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Examples of potentially incompatible waste (aluminum)	Yes	40 CFR 264, App. V EPA 1981c
	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities—Reference air concentration aluminum phosphide	0.3 $\mu\text{g}/\text{m}^3$	40 CFR 266, App. IV EPA 1991
	Health-based limits for exclusion of waste-derived residues—Residue concentration limits	1.0E-02 mg/kg	40 CFR 266, App. VII EPA 1991
	Land Disposal Restrictions—Waste specific prohibitions—spent aluminum potliners; reactive; and carbamate wastes (aluminum)	Yes	40 CFR 268.39 EPA 1996a
	Applicability of treatment standards aluminum aluminum phosphide	F006, F019, K088 P006	40 CFR 268.40 EPA 1994

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Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information	References
<u>NATIONAL (cont.)</u>			
	Treatment standards for hazardous debris	Yes	40 CFR 268.45 EPA 1992a
	Metal bearing waste prohibited from dilution in a combustion unit according to 40 CFR 268.3(c) aluminum	F006 and F019	40 CFR 268, App. XI EPA 1996b
	Requirements for Authorization of State Hazardous Waste Programs—Land disposal restrictions phase III	Spent aluminum potliners	40 CFR 271.1 EPA 1992b
EPA OERR	Designation, Reportable Quantities, and Notification—List of hazardous substances and reportable quantities aluminum phosphide aluminum sulfate	<u>Statutory RQ</u> lbs. (kg) 1 (0.454) 5,000 (2,270)	<u>Final RQ</u> lbs. (kg) 100 (45.4) 5,000 (2,270)
	Emergency Planning and Notification—List of extremely hazardous substances and their threshold planning quantities (aluminum phosphide)	Reportable Quantity: 100 lbs. Threshold Planning Quantity: 500 lbs.	40 CFR 355, App. A EPA 1987a
	Toxic chemical release reporting; Community right-to-know aluminum (fume or dust) aluminum oxide (fibrous forms)	Yes	40 CFR 372.65 EPA 1987c
	Toxic chemical release reporting; Community right-to-know aluminum phosphide	Yes	40 CFR 372.65 EPA 1995d
EPA OPPTS	Pesticide Registration and Classification Procedures—Pesticides classified for restricted use (aluminum phosphide)	Yes	40 CFR 152.175 EPA 1978b
Guidelines: a. Air: ACGIH	TLV TWA Aluminum metal dust pyro powders, as Al welding fumes, as Al soluble salts, as Al alkyls (not otherwise classified) Aluminum oxide	 10 mg/m ³ 5 mg/m ³ 5 mg/m ³ 2 mg/m ³ 2 mg/m ³ 10 mg/m ³	 ACGIH 1996
NIOSH	REL— Aluminum Total dust Respirable fraction Pyro powders Welding fumes Soluble salts Alkyls	 10 mg/m ³ TWA 5 mg/m ³ TWA 5 mg/m ³ TWA 5 mg/m ³ TWA 2 mg/m ³ TWA 2 mg/m ³ TWA	 NIOSH 1992

7. REGULATIONS AND ADVISORIES

Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information	References
<u>NATIONAL (cont.)</u>			
b. Water: EPA OW	Water Quality Guidance for the Great Lakes Systems—Acute Water Quality Criteria for Protection of Aquatic Life in Ambient Water Pollutants that are not bioaccumulative chemicals of concern: Aluminum	Yes	40 CFR 132, Table 1 EPA 1995b
c. Other: ACGIH	Cancer Classification	A4 ^b	ACGIH 1996
DOT	Hazardous Materials	Yes	49 CFR 172.101 DOT 1990
<u>STATE</u>			
Regulations and Guidelines:		Acceptable Ambient Air Concentrations	NATICH 1992
a. Air:			
CT	Aluminum 8-hour	4.00E+01 $\mu\text{g}/\text{m}^3$ (0.013 ppm)	
FL-PINELLA	8-hour 24-hour	1.00E+02 $\mu\text{g}/\text{m}^3$ (0.031 ppm) 2.40E+01 $\mu\text{g}/\text{m}^3$ (0.008 ppm)	
ND	8-hour	1.00E-01 mg/m^3 (0.031 ppm)	
NV	8-hour	2.38E-01 mg/m^3 (0.075 ppm)	
OK	24-hour 24-hour	1.00E+02 $\mu\text{g}/\text{m}^3$ (0.031 ppm) 5.00E+02 $\mu\text{g}/\text{m}^3$ (0.157 ppm)	
TX	30-minute Annual	5.00E+01 $\mu\text{g}/\text{m}^3$ (0.016 ppm) 5.00 $\mu\text{g}/\text{m}^3$ (0.002 ppm)	
VA	24-hour	3.30E+01 $\mu\text{g}/\text{m}^3$ (0.010 ppm)	
WA-SWEST	24-hour	6.70 $\mu\text{g}/\text{m}^3$ (0.002 ppm)	
OK	Aluminum Chloride 24-hour	2.00E+02 $\mu\text{g}/\text{m}^3$ (0.037 ppm)	
ND OK	Aluminum Compounds 8-hour 24-hour	2.00E-02 mg/m^3 2.00E+02 $\mu\text{g}/\text{m}^3$	
AZ	Aluminum Oxide 1-hour 24-hour	4.50E+02 $\mu\text{g}/\text{m}^3$ (0.108 ppm) 1.5E+02 $\mu\text{g}/\text{m}^3$ (0.036 ppm)	
FL-PINELLA	8-hour 24-hour	1.00E+02 $\mu\text{g}/\text{m}^3$ (0.024 ppm) 2.40E+1 $\mu\text{g}/\text{m}^3$ (0.006 ppm)	
ND	8-hour	1.00E-01 mg/m^3 (0.024 ppm)	
TX	30-minute	5.00E+02 $\mu\text{g}/\text{m}^3$ (0.120 ppm)	

7. REGULATIONS AND ADVISORIES

Table 7-1. Regulations and Guidelines Applicable to Aluminum (continued)

Agency	Description	Information	References
<u>STATE (cont.)</u>			
	Annual	5.00E+01 $\mu\text{g}/\text{m}^3$ (0.012 ppm)	
VA	24-hour	1.67E+02 $\mu\text{g}/\text{m}^3$ (0.040 ppm)	
b. Water:	Drinking water quality guidelines and standards		FSTRAC 1995
AZ	Guideline	73 $\mu\text{g}/\text{L}$	
CA	Standard	1,000 $\mu\text{g}/\text{L}$	
ME	Guideline	1,430 $\mu\text{g}/\text{L}$	

^aGroup 1: There is sufficient evidence of carcinogenicity in humans for certain exposures in the aluminum products industry.

^bA4: Not classifiable as a human carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; BAT = Best Available Technology Economically Achievable; BPT = Best Practicable Control Technology Currently Available; EPA = Environmental Protection Agency; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NSPS = New Source Performance Standards; ODW = Office of Drinking Water; OAR = Office of Air and Radiation; OERR = Office of Emergency and Remedial Response; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Wastes; REL = Recommended Exposure Limit; PSES = Performance Standards Existing Sources; PSNS = Performance Standards Existing Sources; TLV = Threshold Limit Value; TWA = Time-Weighted Average; WHO = World Health Organization

7. REGULATIONS AND ADVISORIES

The EPA also regulates aluminum under the Safe Drinking Water Act (SDWA). Although the EPA has not promulgated maximum contaminant levels (MCLs) for aluminum in drinking water, the Agency has established a secondary MCL (SMCL) at a concentration range of 0.05-0.2 mg/L (EPA 1979a; IRIS 1997). The SMCLs are nonenforceable but establish limits for contaminants which could affect the aesthetic qualities of drinking water (IRIS 1997). Aluminum is also regulated by the EPA under the authority of the Clean Water Act (CWA). The regulated point-source categories include electroplating (EPA 1981d), inorganic chemical manufacturing (EPA 1982b), iron and steel manufacturing (EPA 1982e), ore mining and dressing (EPA 19820, coil coating (EPA 1982g), porcelain enameling (EPA 1982h), metal finishing (EPA 1983b), aluminum forming (EPA 1983c), nonferrous metals manufacturing (EPA 1984b), and metal molding and casting (EPA 1985b). Aluminum (fume or dust), aluminum oxide (EPA 1987c), and aluminum phosphide (EPA 1995d) are on the list of chemicals appearing in "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986". Aluminum sulfate has been assigned a reportable quantity (RQ) limit of 5,000 pounds (2,270 kg) (EPA 1985a); aluminum phosphide has an RQ of 100 pounds (45.4 kg) (EPA 1993). The RQ represents the amount of a designated hazardous substance which, when released to the environment, must be reported to the appropriate authority.

EPA recommends a criterion continuous concentration (CCC) of 87 µg/L and a criteria maximum concentration (CMC) of 750 µg/L (EPA 1999). The CCC is an estimate of the highest concentration of aluminum in fresh water to which aquatic organisms can be exposed indefinitely without resulting in an unacceptable effect; the CMC is the highest concentration in fresh water to which aquatic organisms can be exposed for a brief period without resulting in an unacceptable effect.

The EPA has established a tolerance limit of 0.1 ppm for residues of aluminum phosphide in or on raw agricultural commodities such as almonds, barley, corn, dates, rice, sesame seeds, and wheat when it is used as a post-harvest treatment (EPA 1977b).

The Association for the Advancement of Medical Instrumentation has issued a standard recommending that water used in the preparation of dialysate solution contain less than 10 µg aluminum per liter. The purpose is to limit the unintentional administration of aluminum to dialysis patients whose renal dysfunction and the inefficiency of dialysis equipment to remove aluminum could cause an aluminum buildup to biologically hazardous levels (AAM 1998).

