Leaching procedures are used to evaluate the mobility of pollutants and the potential for contamination of ground water and surface waters.

Toxicity Characteristic Leaching Procedure (TCLP) EPA 1311

References: SW-846, Update 3, December 1996;
Code of Federal Regulations, Part 40, Title 261 (40CFR261)

This leaching procedure is used to evaluate the mobility of contaminants in municipal (sanitary) landfills. It is the only leaching procedure approved for hazardous waste characterization under the federal Resource Conservation and Recovery Act (RCRA). Regulatory limits are listed in 40CFR261.24 (see www.ecfr.gov)

Technical:
The solid phase is agitated for ~18 hours, with an amount of fluid equal to 20 times the weight of the solid phase (minimum sample size: 50g for Zero Headspace Extraction for volatiles, 100g for semivolatile organic or inorganic analyses). For soil samples with pH < 5 or for any sample being analyzed for volatile organics, the extraction fluid is a buffered solution prepared from sodium hydroxide and acetic acid at pH 4.93. For soil samples with pH > 5, the extraction fluid is an unbuffered solution of acetic acid and reagent water at pH 2.88.

Synthetic Precipitation Leaching Procedure (SPLP) EPA 1312

Reference: SW-846, Update 3, December 1996

This leaching procedure may be used to evaluate the mobility of contaminants in solid waste facilities from which municipal waste is excluded, and to study the potential impact of the sample constituents on local groundwater if the soil is left on site. The fluid used in the extraction depends on the region of the country where the sampling site is located: precipitation is slightly more acidic east of the Mississippi, due to coal and heavy industry.

Technical:
The solid phase is agitated for ~18 hours, with an amount of fluid equal to 20 times the weight of the solid phase (minimum sample size: 50g for Zero Headspace Extraction for volatiles, 100g for semivolatile organic or inorganic analyses). The leaching fluid is an unbuffered solution prepared using sulfuric and nitric acids. For sampling sites east of the Mississippi, the leaching fluid is prepared at a pH of 4.2; west of the Mississippi, a pH of 5.0 is used.

Soluble Threshold Limit Concentration (STLC) CCR T22:66261.24

Reference: California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.24

This leaching procedure may be used to evaluate the mobility of contaminants in landfills. It is used within the state of California for hazardous waste characterization, to determine which type of landfill will be able to accept the material.

Technical:
The solid phase is agitated for 48 hours, with an amount of fluid equal to 10 times the weight of the solid phase (minimum sample size: 50g). The leaching fluid is a buffered solution that is prepared using sodium hydroxide and citric acid at a pH of 5.0.

REGULATORY LIMITS

METALS			TTLC	STLC	TCLP
CAS #		Analyte	mg/Kg	mg/L	mg/L
7440-36-0	Sb	Antimony	500	15	- -
7440-38-2	As	Arsenic	500	5	5
7440-39-3	Ba	Barium	10,000	100	100
7440-41-7	Be	Beryllium	75	0.75	- -
7440-43-9	Cd	Cadmium	100	1	1
7440-47-3	Cr	Chromium	2,500	5	5
7440-48-4	Co	Cobalt	8,000	80	- -
7440-50-8	Cu	Copper	2,500	25	- -
7439-92-1	Pb	Lead	1,000	5	5
7439-97-6	Hg	Mercury	20	0.2	0.2
7439-98-7	Mo	Molybdenum	3,500	350	- -
7440-02-0	Ni	Nickel	2,000	20	- -
7482-49-2	Se	Selenium	100	1	1
7440-22-4	Ag	Silver	500	5	5
7440-28-0	Tl	Thallium	700	7	- -
7440-62-2	V	Vanadium	2,400	24	- -
7440-66-6	Zn	Zinc	5,000	250	- -
7440-47-3		Hexavalent Chromium	500	5	- -

VOLATILE ORGANICS		TTLC	STLC	TCLP
CAS #	Analyte	mg/Kg	mg/L	mg/L
71-43-2	Benzene	- -	- -	0.5
78-93-3	2-Butanone (MEK)	- -	- -	200
56-23-5	Carbon Tetrachloride	- -	- -	0.5
108-90-7	Chlorobenzene	- -	- -	100
67-66-3	Chloroform	- -	- -	6
107-06-2	1,2-Dichloroethane	- -	- -	0.5
75-35-4	1,1-Dichloroethene	- -	- -	0.7
127-18-4	Tetrachloroethene	- -	- -	0.7
79-01-6	Trichloroethene	2,040	204	0.5
75-01-4	Vinyl Chloride	- -	- -	0.2

SEMIVOLATILE ORGANICS		TTLC	STLC	TCLP
CAS #	Analyte	mg/Kg	mg/L	mg/L
106-46-7	1,4-Dichlorobenzene	- -	- -	7.5
121-14-2	2,4-Dinitrotoluene	- -	- -	0.13
118-74-1	Hexachlorobenzene	- -	- -	0.13
87-68-3	Hexachlorobutadiene	- -	- -	0.5
67-72-1	Hexachloroethane	- -	- -	3
95-48-7	2-Methylphenol	- -	- -	200

REGULATORY LIMITS

108-39-4	3-Methylphenol	- -	- -	200
1319-77-3	4-Methylphenol	- -	- -	200
98-95-3	Nitrobenzene	- -	- -	2
87-86-5	Pentachlorophenol	17	1.7	100
110-86-1	Pyridine	- -	- -	5
95-95-4	2,4,5-Trichlorophenol	- -	- -	400
88-06-2	2,4,6-Trichlorophenol	- -	- -	2

PESTICIDES & PCB		TTLC	STLC	TCLP
CAS #	Analyte	mg/Kg	mg/L	mg/L
309-00-2	Aldrin	1.4	0.14	- -
58-89-9	g-BHC (Lindane)	4	0.4	0.4
12789-03-6	Chlordane	2.5	0.25	0.03
varies	DDD, DDE, DDT	1	0.1	- -
60-57-1	Dieldrin	8	0.8	- -
72-20-8	Endrin	0.2	0.02	0.02
76-44-8	Heptachlor	4.7	0.47	0.008
143-50-0	Kepone	21	2.1	- -
72-43-5	Methoxychlor	100	10	10
72-43-5	Mirex	21	2.1	- -
Varies	PCB's	50	5	- -
8001-35-2	Toxaphene	5	0.5	0.5

HERBICIDES		TTLC	STLC	TCLP
CAS #	Analyte	mg/Kg	mg/L	mg/L
94-75-7	2,4-D	100	10	10
93-72-1	2,4,5-TP (Silvex)	10	1	1

MISCELLANEOUS		TTLC	STLC	TCLP
CAS #	Analyte	mg/Kg	mg/L	mg/L
	Asbestos	1%	- -	- -
1746-01-6	Dioxin (2,3,7,8-TCDD)	0.01	0.001	- -
	Fluoride salts	18,000	180	- -
	Organic Lead	13	- -	- -

DECISION GUIDE

METALS			Run STLC if Total exceeds (mg/Kg)	STLC Regulatory Limit (mg/L)	Run TCLP if Total exceeds (mg/Kg)	TCLP Regulatory Limit (mg/L)
CAS #		Analyte				
7440-36-0	Sb	Antimony	150	15	- -	- -
7440-38-2	As	Arsenic	50	5	100	5
7440-39-3	Ba	Barium	1,000	100	2,000	100
7440-41-7	Be	Beryllium	7.5	0.75	- -	- -
7440-43-9	Cd	Cadmium	10	1	20	1
7440-47-3	Cr	Chromium	50	5	100	5
7440-48-4	Co	Cobalt	800	80	- -	- -
7440-50-8	Cu	Copper	250	25	- -	- -
7439-92-1	Pb	Lead	50	5	100	5
7439-97-6	Hg	Mercury	2	0.2	4	0.2
7439-98-7	Mo	Molybdenum	3,500	350	- -	- -
7440-02-0	Ni	Nickel	200	20	- -	- -
7482-49-2	Se	Selenium	10	1	20	1
7440-22-4	Ag	Silver	50	5	100	5
7440-28-0	Tl	Thallium	70	7	- -	- -
7440-62-2	V	Vanadium	240	24	- -	- -
7440-66-6	Zn	Zinc	2,500	250	- -	- -
7440-47-3		Hexavalent Chromium	50	5	- -	- -

VOLATILE ORGANICS		Run STLC if Total exceeds (mg/Kg)	STLC Regulatory Limit (mg/L)	Run TCLP if Total exceeds (mg/Kg)	TCLP Regulatory Limit (mg/L)
CAS #	Analyte				
71-43-2	Benzene	- -	- -	10	0.5
78-93-3	2-Butanone (MEK)	- -	- -	4,000	200
56-23-5	Carbon Tetrachloride	- -	- -	10	0.5
108-90-7	Chlorobenzene	- -	- -	2,000	100
67-66-3	Chloroform	- -	- -	120	6
107-06-2	1,2-Dichloroethane	- -	- -	10	0.5
75-35-4	1,1-Dichloroethene	- -	- -	14	0.7
127-18-4	Tetrachloroethene	- -	- -	14	0.7
79-01-6	Trichloroethene	2,040	204	10	0.5
75-01-4	Vinyl Chloride	- -	- -	4	0.2

SEMIVOLATILE ORGANICS		Run STLC if Total exceeds (mg/Kg)	STLC Regulatory Limit (mg/L)	Run TCLP if Total exceeds (mg/Kg)	TCLP Regulatory Limit (mg/L)
CAS #	Analyte				
106-46-7	1,4-Dichlorobenzene	- -	- -	150	7.5

DECISION GUIDE

121-14-2	2,4-Dinitrotoluene	- -	- -	2.6	0.13
118-74-1	Hexachlorobenzene	- -	- -	2.6	0.13
87-68-3	Hexachlorobutadiene	- -	- -	10	0.5
67-72-1	Hexachloroethane	- -	- -	60	3
95-48-7	2-Methylphenol	- -	- -	4,000	200
108-39-4	3-Methylphenol	- -	- -	4,000	200
1319-77-3	4-Methylphenol	- -	- -	4,000	200
98-95-3	Nitrobenzene	- -	- -	40	2
87-86-5	Pentachlorophenol	17	1.7	2,000	100
110-86-1	Pyridine	- -	- -	100	5
95-95-4	2,4,5-Trichlorophenol	- -	- -	8,000	400
88-06-2	2,4,6-Trichlorophenol	- -	- -	40	2

PESTICIDES & PCB		**Run STLC** if Total exceeds (mg/Kg)	STLC Regulatory Limit (mg/L)	**Run TCLP** if Total exceeds (mg/Kg)	TCLP Regulatory Limit (mg/L)
CAS #	Analyte				
309-00-2	Aldrin	1.4	0.14	- -	- -
58-89-9	g-BHC (Lindane)	4	0.4	8	0.4
12789-03-6	Chlordane	2.5	0.25	0.6	0.03
varies	DDD, DDE, DDT	1	0.1	- -	- -
60-57-1	Dieldrin	8	0.8	- -	- -
72-20-8	Endrin	0.2	0.02	0.4	0.02
76-44-8	Heptachlor	4.7	0.47	0.16	0.008
143-50-0	Kepone	21	2.1	- -	- -
72-43-5	Methoxychlor	100	10	200	10
72-43-5	Mirex	21	2.1	- -	- -
Varies	PCB's	50	5	- -	- -
8001-35-2	Toxaphene	5	0.5	10	0.5