

Hazardous Waste Fact Sheet:

TCLP: Toxicity Characteristics Leaching Procedure and Characteristic Hazardous Wastes

Provided by EHSO: <http://www.EHSO.com>

The TCLP: Toxicity Characteristic Leaching Procedure

The TCLP or Toxicity Characteristic Leaching (not Leachate) Procedure is designed to determine the mobility of both organic and inorganic analyses present in liquid, solid, and multiphase wastes. This is usually used to determine if a waste meets the definition of EP Toxicity, that is, carrying a hazardous waste code under RCRA (40 CFR Part 261) of D004 through D052. As it is the generator's responsibility to make this determination, but generators often contract outside labs to perform an analysis on their waste using TCLP. The Code of Federal Regulations (CFR) 40 CFR §261.24, outlines the 40 contaminants the TCLP analysis tests (see table 1- Maximum Concentration of Contaminants for Toxicity Characteristics). If a "Solid Waste" fails the test for one or more of these compounds, the waste is considered to be a characteristic hazardous waste-unless there is an exception that applies. Bear in mind, too, that a characteristic waste may still be a "listed" hazardous waste.

What does the TCLP Analysis Show?

The TCLP analysis simulates landfill conditions. Over time, water and other liquids percolate through landfills. The percolating liquid often reacts with the solid waste in the landfill, and may pose public and environmental health risks because of the contaminants it absorbs. The TCLP analysis determines which of the contaminants identified by the United States Environmental Protection Agency (EPA) are present in the leachate and their concentrations.

Who Performs the TCLP?

There are many businesses, in almost every state, which can perform these analyses. Look in the yellow pages under "Laboratories-Analytical". Many laboratories will offer courier services for a nominal fee, and provide sampling containers and a chain of custody form. Businesses in remote areas should contact the nearest lab to discuss sampling protocol and sample preparation for transportation. Improper sample handling can result in unreliable test results and wasted money! **What does it cost?**

The cost of the TCLP depends on the laboratory and location: but typically, a full TCLP analysis may cost as much as \$3,000.

When is a Waste Hazardous?

A waste is considered hazardous when it exhibits one or more of the following characteristics:

- **Ignitable** (flashpoint <140°F)
- **Corrosive** (aqueous pH <2 or > 12.5)
- **Reactive** (normally unstable, undergoes violent changes without detonating, water reactive)
- **Toxic** (exceeds the regulatory limits for contaminants under the TCLP or "7-11 Test" analysis)
OR it is "Listed" in the CFR (waste which are pre-defined and categorized)

For the purpose of this fact sheet, a waste is considered hazardous due to toxicity if it exhibits results exceeding the regulatory limits outlined in Table 1 above. There are many exclusions and exceptions within CFR. For this reason, call your state EPA (DEP< DER, etc.) or talk to your hazardous waste inspector if you have ANY questions.

EXAMPLES

Auto Repairs:

An auto repair shop uses "hi-flash" mineral spirits as parts washing solvent. The solvent does not contain any halogenated or listed solvents. When the solvent becomes dirty, it is distilled. The solvent extracted from the distillation

is placed back into use, and the “still bottoms” or contaminants from the solvent extraction are the waste product. This waste must be tested by an analytical laboratory before it is discarded. The laboratory performs the “7-11 Test”, and the result indicates the following:

Lead 0.8mg/l

Cadmium 0.5mg/l Chromium 8.0mg/l

Looking at the table on the front of this fact sheet, lead and cadmium exhibit concentrations below regulatory levels. Chromium exceeds regulatory levels. The still bottoms exhibit toxicity due to high chromium levels, and would be considered a hazardous waste D007.

Auto Body:

The exhaust filters in the spray booth have become saturated with overspray from paint application. Since the body shop uses many different types of paints and primers, it's difficult to determine if the filters are hazardous without an analysis. A representative filter is removed and sampled. The remaining filters are placed into containers and marked “filters pending analysis”. The laboratory performs the “7-11 test”, and the results indicate the following:

Lead 9.1mg/l

Chromium 0.4mg/l

Barium 0.85mg/l

Methyl ethyl ketone (MEK) 10 mg/l

Only lead exceeded the regulatory levels. The exhaust filters are deemed hazardous due to lead toxicity, and referred to as a D008 waste. The business owner remembered that he used a special primer a friend gave him. After looking at the Material Safety Data Sheet (MSDS), the business owner found out why the filters failed the test. The special primer contained high amounts of lead. Six months later, the filters need changing again. The business owner had kept detailed records of all the paints and primers sprayed, along with the total quantities since the last filter change out. Another analysis was performed, and the analytical report indicated all of the containments were well below the regulatory limits. The filters were not found to exhibit any characteristics of toxicity, and were allowed to be handled as regular municipal solid waste. Because the business owner maintained detailed records, further testing would not be required unless the types of paints and primers changed.

General Manufacturing:

The QRM Company receives large steel components which they re-manufacture. The process requires them to dismantle the components, and surfaces prepare the outer housings for re-finishing. The metal components are placed into a sand blasting cabinet, and cleaned with special high pressure media. After months of use, the blasting media became ineffective, and needed to be replaced. The old blasting material was placed into a metal drum, and labeled “used blasting media pending analysis”. A representative sample was taken to the laboratory for the “7-11 tests” analysis. The results are:

Arsenic 0.5mg/l

Barium 10mg/l

Cadmium 2.0mg/l

Chromium 15.0mg/l

Lead 25mg/l

This analysis reported Cadmium, Chromium, and Lead in excess of regulatory limits. The blaster media waste would be classified as toxic due to high concentrations of Cadmium D006, Chromium D007 and Lead D008. This waste would be labeled as a D006, D007, and D008 hazardous waste.

For more information on this and many other environmental, health and safety subjects, such as where to find a list of labs, go online to <http://www.ehso.com>. Our full alphabetized table of contents is found at <http://www.ehso.com/contents.php>.

TOXICITY Characteristic Leaching Procedure (TCLP)

A waste is TCLP toxic if the concentration of any constituent in the following table exceeds the standard assigned to that substance. The TCLP test is a methodology which attempts to simulate the conditions within the landfill. An acidic solution is passed through a sample of waste and the resultant “leachate” is analyzed for contaminants. The TCLP is designed to detect heavy metals, pesticides and few other organic and inorganic compounds. The purpose of the test is to prevent groundwater contamination by highly toxic materials. TCLP tests the mobility of 40 different elements and compounds. The following table shows all of the TCLP constituents and their regulatory levels.

Table 1- Maximum Concentration of Contaminants for Toxicity Characteristic

EPA HW#	Contaminant	Regulatory Level (mg/l)	New 20x rule (mg/kg)
D004	Arsenic (As)	5.0	100.00
D005	Barium (Ba)	100.0	2000.00
D018	Benzene	0.5	10.00
D006	Cadmium (Cd)	1.0	20.00
D019	Carbon Tetrachloride	0.5	10.00
D020	Chlordane	0.03	.60
D021	Chlorobenzene	100.0	2000.00
D022	Chloroform	6.0	120.00
D007	Chromium (Cr)	5.0	100.00
D023	o-Cresol	200.0	4000.00
D024	m-Cresol	200.0	4000.00
D025	p-Cresol	200.0	4000.00
D026	Cresol	200.0	4000.00
D016	2,4-D	10.0	200.00
D027	1,4-Dichlorobenzene	7.5	150.00
D028	1,2-Dichloromethane	0.5	10.00
D029	1,1-Dichloroethylene	0.7	14.00
D030	2,4-Dinitrotoluene	0.13	2.60
D012	Endrin	0.02	.40
D031	Heptachlor	0.008	.16
D032	Hex chlorobenzene	0.13	2.60
D033	Hexachlorobutadiene	0.5	10.00
D034	Hexachloroethane	3.0	60.00
D008	Lead (Pb)	5.0	100.00
D013	Lindane	0.4	8.00
D009	Mercury (Hg)	0.2	4.00
D014	Methoxychlor	10.0	200.00
D035	Methyl Ethyl Ketone	200.0	4000.00
D036	Nitrobenzene	2.0	40.00
D037	Pentachloroethylene	100.0	2000.00
D038	Pyridine	5.0	100.00
D010	Selenium (Se)	1.0	20.00

The “20 Times” rule is only applied to materials that are 100% solid.

The “20 Times Rule” for analyzing the metals concentration states that if the results of a “totals Test” is 20 times the TCLP regulatory limit or greater, the material has the potential to be hazardous. If the Totals Test is higher than 20 times the TCLP regulatory limit, the material should be re-tested with a TCLP test for the specific constituents.

D011	Silver (Ag)	5.0	100.00
D039	Tetrachloroethylene	0.7	14.00
	Toxaphene	0.5	10.00
D040	Trichloroethylene	0.5	10.00
D041	D015	400.0	8000.00
D042	2,4,6-Trichlorophenol	2.0	40.00
D017	2,4,5-TP (Silvex)	1.0	20.00
D043	Vinyl Chloride	0.2	4.00