# Hazardous Waste Fact Sheet: TCLP: Toxicity Characteristic Leaching Procedure and Characteristic Hazardous Wastes

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## 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 analytes present in liquid, solid, and multiphasic wastes. This is usually used to determine if a waste may meet 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 the TCLP test, these questions and answers may be helpful to generators. For this reason and sometimes in cleanup actions, businesses are often asked to perform an analysis on their waste using the TCLP. The Code of Federal Regulations (CFR) 40 CFR §261.24, outlines the 40 contaminants the TCLP analysis tests for (See Table 1—Maximum Concentration of Contaminants for Toxicity Characteristic). 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 exemption that applies. Bear in mind, too, that a characteristic waste may still also be a "listed" hazardous waste.

Table 1—Maximum Concentration of Contaminants for Toxicity Characteristic

| EPA HW # | Contaminant | Regulatory Level (mg/l) |
|---|---|---|
| D004 | Arsenic (As) | 5.0 |
| D005 | Barium (Ba) | 100.0 |
| D018 | Benzene | 0.5 |
| D006 | Cadmium (Cd) | 1.0 |
| D019 | Carbon Tetrachloride | 0.5 |
| D020 | Chlordane | 0.03 |
| D021 | Chlorobenzene | 100.0 |
| D022 | Chloroform | 6.0 |
| D007 | Chromium (Cr) | 5.0 |
| D023 | o-Cresol | 200.0 |
| D024 | m-Cresol | 200.0 |
| D025 | p-Cresol | 200.0 |
| D026 | Cresol | 200.0 |
| D016 | 2,4-D | 10.0 |
| D027 | 1,4-Dichlorobenzene | 7.5 |
| D028 | 1,2-Dichloroethane | 0.5 |
| D029 | 1,1-Dichloroethylene | 0.7 |
| D030 | 2,4-Dinitrotoluene | 0.13 |
| D012 | Endrin | 0.02 |
| D031 | Heptachlor | 0.008 |
| D032 | Hexachlorobenzene | 0.13 |
| D033 | Hexachlorobutadiene | 0.5 |
| D034 | Hexachloroethane | 3.0 |
| D008 | Lead (Pb) | 5.0 |
| D013 | Lindane | 0.4 |
| D009 | Mercury (Hg) | 0.2 |
| D014 | Methoxychlor | 10.0 |
| D035 | Methyl ethyl ketone | 200.0 |
| D036 | Nitrobenzene | 2.0 |
| D037 | Pentachlorophenol | 100.0 |
| D038 | Pyridine | 5.0 |
| D010 | Selenium (Se) | 1.0 |
| D011 | Silver (Ag) | 5.0 |
| D039 | Tetrachloroethylene | 0.7 |
| D015 | Toxaphene | 0.5 |
| D040 | Trichloroethylene | 0.5 |
| D041 | 2,4, 5-Trichlorophenol | 400.0 |
| D042 | 2,4,6-Trichlorophenol | 2.0 |
| D017 | 2,4,5-TP (Silvex) | 1.0 |
| D043 | Vinyl Chloride | 0.2 |

### 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, who can perform these analysis. 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*** (exceeding the regulatory limits for contaminants under the TCLP or "7-11 test" analysis)

**OR** it is *"Listed"* in the CFR (wastes which are pre-defined and categorized)

For the purposes 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 exemptions within the CFR. For this reason, call the your state EPA (DEP, DER, etc.) or talk to your hazardous waste inspector if you have ANY questions!

*(Continued from page 1)*

## EXAMPLES

### Auto Repair:

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 product must be tested by an analytical laboratory before it is discarded. The laboratory performs the “7-11 test”, and the results indicate the following:

| | |
|---|---|
| Lead | 0.8 mg/l |
| Cadmium | 0.5 mg/l |
| Chromium | 8.0 mg/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, its 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 | 9.1 mg/l |
| Chromium | 0.4 mg/l |
| Barium | 0.85 mg/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 contaminants 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 paint 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 surface 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 test” analysis. The results are:

| | |
|---|---|
| Arsenic | 0.5 mg/l |
| Barium | 10 mg/l |
| Cadmium | 2.0 mg/l |
| Chromium | 15.0 mg/l |
| Lead | 25 mg/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, 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 .