

Characteristics of Hazardous Waste and some Key Federal and California Differences

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ALL "HAZARDOUS WASTES" ARE BASED ON 4 TYPES OF HAZARDS

HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL.
IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY OR THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCE CONTROL.

GENERATOR INFORMATION:

NAME _____
ADDRESS _____ PHONE _____
CITY _____ STATE _____ ZIP _____
EPA / MANIFEST ID NO. / DOCUMENT NO. _____ / _____
EPA WASTE NO. _____ CA. WASTE NO. _____ ACCUMULATION START DATE _____

CONTENTS COMPOSITION _____

PHYSICAL STATE | HAZARDOUS PROPERTIES FLAMMABLE TOXIC
 SOLID LIQUID | CORROSIVE REACTIVITY OTHER _____

[_____

_____]

D.O.T. PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX

HANDLE WITH CARE!

EMED Co., Inc. • 1-800-442-3837 08 1500

- Characteristic of Reactivity
- Characteristic of Corrosivity
- Characteristic of Ignitability
- Characteristics of Toxicity

EPA Website - Defining Hazardous Waste: Listed, Characteristic and Mixed Radiological Wastes

<https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes#toxic>

Characteristic of Reactivity

- Reacts violently with water
- Forms explosive mixtures with water
- When mixed with water, forms toxic gases
- Normally unstable & violent change without detonation
- Cyanide or sulfide bearing waste that can generate toxic gases when mixed with non-corrosive liquids
- Capable of detonating under a strong initiating source or heat with confinement
- Explosive under normal conditions
- Forbidden Explosive, Class A or Class B Explosive per DOT definition



Characteristic of Corrosivity

- An aqueous liquid with a pH ≤ 2 or ≥ 12.5
- A liquid that corrodes steel (SAE 1020) at a rate greater than 6.35 mm per year



Characteristic of Ignitability

- A solid capable of causing fire through friction, absorption of moisture or spontaneous chemical changes and burns vigorously to create a hazard.
- A liquid with a flash point less than 140 degrees F
- Ignitable gas as defined by 49 CFR 173.300.
- Oxidizer as defined in 49 CFR 173.151.

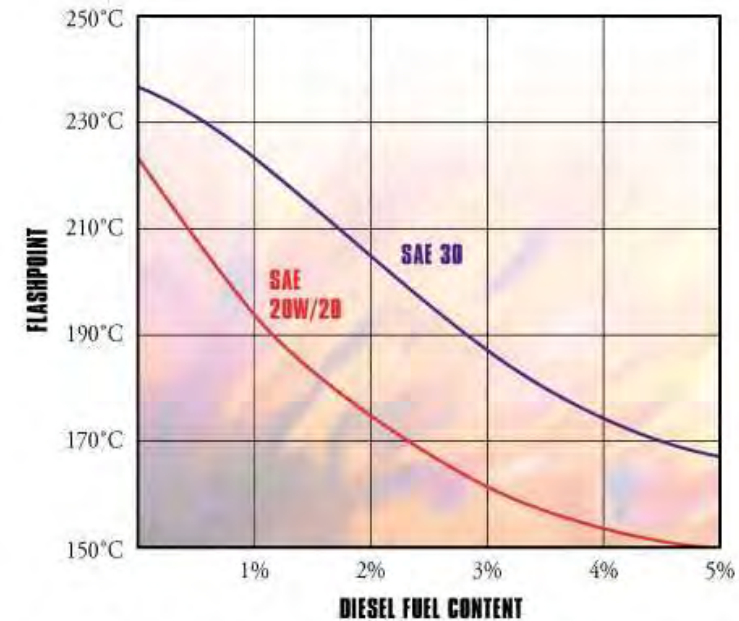
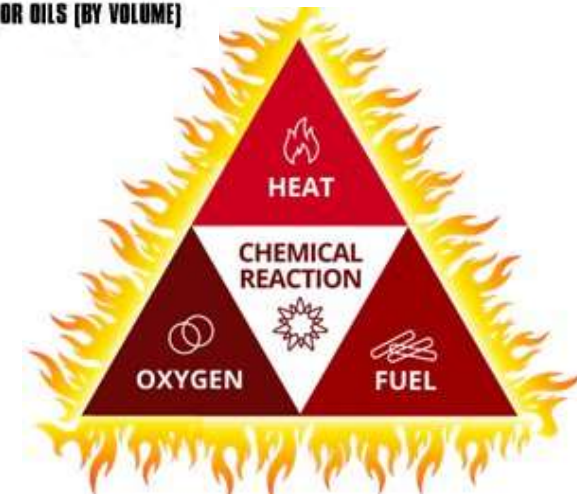


FIGURE 3. DIESEL FUEL CONTENT AND FLASHPOINT IN MOTOR OILS (BY VOLUME)

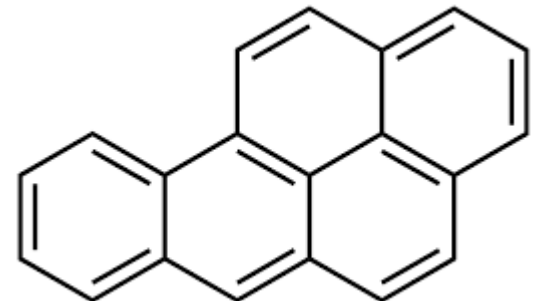


Characteristics of Toxicity

- Initially based on **Chronic Toxicity** from the Safe Drinking Water Standards set in the 1970's
- Eight metals
- Four pesticides
- Two herbicides
- Twenty six organic compounds (added in 1990)
- Listed as D004 to D043 Waste ID Codes

Benzo(a)pyrene

First known human dermal carcinogen concentrated from manufactured gas plant tar



Toxicity Determination

- Liquids can be tested using any method as long as it has documented quality control
- By definition, liquids contain less than 0.5% solids
- Solids must go through a procedure that mimics landfill conditions called a **Toxic Characteristic Leaching Procedure (TCLP)** prior to testing.



The Toxic Characteristic Leaching Procedure (TCLP)

- Promulgated in 1990 replacing the EP (Extraction Procedure) Toxicity test
- Solid/liquid samples are separated, the solids are processed and then re-combined with the liquid portion for analysis.
 - Acetic acid for a leaching agent (20 parts acid to 1 part sample)
 - Put into a tumbler for 18 hours
 - Then filtered and the leachate is analyzed (solids are discarded)



TCLP Results

- The test results are compared to values (mg/L) in Table I of CCR, Title 22 66261.24 as the Regulatory Level.
 - Equal to or greater than RL makes the waste material a RCRA Hazardous Waste.
- Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Lead
 - Mercury
 - Selenium
 - Silver

CA's Version of Toxic Constituents

- Table II of 66261.24(a) for metals and inorganics
- Table III of 66261.24(a) for bio-accumulative or persistent organics
- Both tables have a **liquid threshold** and a **solid threshold** for being a hazardous waste (Feds only have liquid threshold)

CA Toxicity Criteria – 22 CCR 66261.24

- Evaluate agents shown to cause hazards to health/environment
- 20 Metals/Inorganics (Table II)
- 18 Persistent or Bioaccumulative Toxic Substances (Table III)
 - Oral LD50 less than 2,500mg/kg
 - Dermal LD50 less than 4,300 mg/kg
 - Inhalation LC50 less than 10,000 ppm
 - 96 hour Aquatic Bioassay (LC50 less than 500 mg/L)
- 0.001% weight listed constituents (16 OSHA carcinogens)

CA Replaces TCLP with the TTLC & the STLC (Waste Extraction Test or WET test)

- TTLC = Total Threshold Limit Concentration
 - Totals metal analysis rather than leaching simulation
 - High failure rate – RL are relatively low for conservatism and low cost testing
- No sample dilution
 - Doesn't consider landfill conditions
 - Based on conservative leaching model predictions associated with worst-case environment
- STLC = Soluble Threshold Limit Concentration (WET Test)
 - Same concept as the TCLP, but uses a weaker acid at more neutral pH and extracts for a greater time

California WET Procedure

- Uses procedure from 22CCR Div.4.5, CH.11, Appendix II
- Used for 17 metals, 2 inorganics, asbestos, 10 pesticides and 8 other organics
- Solids milled to 0.45 microns
- Mixed 10:1 with sodium citrate solution to solids
- Leaching period is 48 hours
- Leachate is analyzed

66261.24 Table II Metals

(Bold = CA Only Metals)

- Arsenic
- Barium
- Lead
- Mercury
- Cadmium
- Chromium
- Selenium
- Silver

- **Antimony**
- **Molybdenum**
- **Nickel**
- **Thallium**
- **Vanadium**
- **Zinc**
- **Beryllium**
- **Cobalt**
- **Copper**

Chromium

- California differentiates chrome VI and chrome III
- California has a STLC limit for chrome III of 560mg/l (only if the waste passes the TCLP process)

Asbestos

- Only applies to substances that are in a friable, powdered or finely divided state
 - Or become friable upon removal, aka during abatement process
 - Class 1 is friable under federal law and Class 2 is non-friable.
 - Friability controls waste classification, Class 2 non-friable must be declared in construction debris.
- There is no STLC for asbestos
 - Fiber counts in air and water rather than a concentration since insoluble
- Tested using a microscope and based on percentage of waste
 - Typically a non-specific count of particles.
 - More expensive testing to differentiate between bulk particles and asbestos particles.
- Includes all six types of asbestos
- Cal-OSHA requires worker protection for exposure to all levels of asbestos

Determination of HW in CA (Solids w/Metals)

- Typically TTLC is run first (test name is for CAM-17 metals)
 - The test is inexpensive and gives valuable information for both RCRA and CA
- If results are less than the TTLC numbers, see if they are greater than 10 times the STLC numbers in Table II and Table III
 - If yes, you must run a STLC
 - If the results of the STLC are below the numbers listed in Table II, then the waste is not a hazardous waste for toxicity per CCR 66261.23(a)(1) and (2).
- See if results are > TTLC levels, then at least a CA Haz Waste
- See if results are 20 times greater than the TTLC values
 - If yes, you must run a TCLP.
- However, in CA there are still 6 more toxicity criteria to check

TCLP Vs STLC (Lead Example)

Federal TCLP

- Solid waste with 100 mg/kg of lead
- 50 % leaches
- 20 to 1 dilution
- 50 mg/L divided by 20
- Results = 2.5mg/L
- **Not a RCRA Hazardous Waste**

CA STLC

- Solid waste with 100 mg/kg of lead
- 50 % leaches
- 10 to 1 dilution
- 50 mg/L divided by 10
- Results = 5mg/L
- **A Non RCRA but CA Hazardous Waste**

Scrap Metal Exemption

Title 22, Section 66261.6(a)(3)(B)



Scrap Metal Recycling Exemption

Both the Federal Government and the CA State Government allow for recycled scrap metal to be excluded from hazardous waste requirements. The definition for the exemption is not the same. The CA's exclusions are more stringent than the Feds.

CA Excludes From Scrap Metal (Title 22, Section 66260.10)

- Lead acid batteries
- Magnesium borings.... capable of independent combustion
- Beryllium borings.... capable of producing adverse health effects
- Any metal contaminated with hazardous waste
- Any metal with free flowing oil that is a hazardous waste and
- **Sludges, fine powders** (<100 microns), semi-liquids and liquid solutions that are hazardous wastes

ACUTELY HAZARDOUS WASTE
VS
EXTREMELY HAZARDOUS WASTE

RCRA Acutely Hazardous Waste

- P listed wastes (205 materials)
- 1 Kg threshold in any given month for LQG status
- Can require Biennial Report
- Containers must be triple rinsed to be considered “empty”
- Must be from an un-used, single ingredient material
- Watch lab clean-outs and pharmaceuticals

CA Extremely Hazardous Waste

- Criteria found in 66261.107
- Oral LD50 of less than or equal 50 mg/Kg
- Dermal LD50 less than or equal 43 mg/Kg
- Inhalation LC50 less than or equal to 100 ppm of gas or vapor
- Substance listed in 66261.24(a)(7) in concentration of 0.1 or greater
- Water reactive

CA Extremely Hazardous Waste

- LQG status if generate one Kg or more in any given month
- SB 14, Pollution Prevention Plan required if generate 12 kilograms or more per year
- No triple rinsing requirement, does not affect empty containers