

THE INTERSECTION OF DOT CLASSIFICATION WITH THE RCRA AND NON-RCRA CHARACTERISTICS

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The Intersection of DOT Classification With the RCRA and Non-RCRA Characteristics



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Objectives

1. Introduce the criteria for the DOT's nine hazard classes, including:
 - The DOT definition of hazardous material
 - Test criteria for the hazard classes and divisions
 - Additional issues (e.g., exceptions)
2. Review the criteria for RCRA and non-RCRA characteristics
3. Discuss the similarities and significant differences between the tests and criteria and how they can affect management



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Shipping Hazardous Waste Off Site
What's It All About?

Generators are not allowed to accumulate their hazardous wastes for an unlimited amount of time


- They must manage two regulatory program requirements



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Shipping Hazardous Waste Off Site
What You Need to Know

- The properties of the hazardous waste
- The site's EPA ID number
- How the waste will be packaged
- Who will be transporting the waste
- Who the TSDF is that will receive the waste




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Hazardous Wastes in Transportation
The EPA's Mandate

The CalEPA enforces RCRA

- RCRA's mission is to protect human health and the natural environment from the potential hazards of waste disposal; conserve energy and natural resources; reduce the amount of waste generated through source reduction and recycling; and ensure the management of waste in an environmentally sound manner




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 **Hazardous Wastes in Transportation**
The DOT's Mandate

The DOT enforces transportation safety through the Pipeline and Hazardous Material Safety Administration (PHMSA)


- PHMSA's mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials




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 **Unique Definitions**
EPA Waste ID vs. DOT Classification

Both the EPA and the DOT use the chemical and physical properties of a material in their determinations.




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 **Unique Definitions**
EPA Waste ID vs. DOT Classification

While there are intersections between the regulated properties, many have significant differences

- The RCRA waste code D002 is called the characteristic of _____
- The DOT Hazard Class 8 is called _____




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Unique Definitions
EPA Waste ID vs. DOT Classification

While there are intersections between the regulated properties, many have significant differences

- The RCRA waste code D002 is called the characteristic of **corrosivity**.
- The DOT Hazard Class 8 is called _____




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Unique Definitions
EPA Waste ID vs. DOT Classification

While there are intersections between the regulated properties, many have significant differences

- The RCRA waste code D002 is called the characteristic of **corrosivity**
- The DOT Hazard Class 8 is called **corrosive materials**




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Unique Definitions
EPA Waste ID vs. DOT Classification

While there are intersections between the regulated properties, many have significant differences

- The RCRA waste code D002 is called the characteristic of **corrosivity**.
 - Tests include pH
 - Steel corrosion
- The DOT Hazard Class 8 is called **corrosive materials**.
 - Tests include irreversible skin damage
 - Steel AND aluminum corrosion





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 **The Importance of Coordination**


In various steps, the RCRA and DOT programs can interact


- Both may rely on test results in determinations
- Both are ultimately generator/shipper's responsibility
- RCRA vs non-RCRA affects DOT classification
- Onsite management issues
 - UN specification packages to avoid transfers and air emissions
 - Correct hazard communication if used to ship
- Additional categories like CA "Wastes of Concern"




 CalEPA
California Environmental Protection Agency

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 **DOT Hazardous Materials Classification**

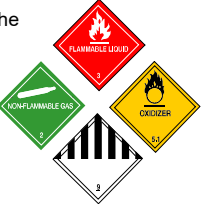


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 **Three Ways a Material Becomes Designated as Hazardous**

There are three ways a material can be classified as a hazardous material:

1. It is classified as hazardous by the DOT in the Hazmat Table
2. It meets one or more of the defining criteria for Hazard Classes 1–8
3. It meets the definition of Miscellaneous Class 9



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Class 1 Explosives

Class 1 is divided into six divisions:

- Division 1.1 – Mass explosives
- Division 1.2 – Projectile explosives
- Division 1.3 – Incendiary explosives
- Division 1.4 – Minor explosives
- Division 1.5 – Very insensitive explosives
- Division 1.6 – Extremely insensitive articles









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Class 2 Compressed Gases

Class 2 is divided into three divisions:

- Division 2.1 – Flammable Gases
- Division 2.2 – Non-flammable, Non-poisonous Compressed Gases
- Division 2.3 – Poisonous Gases




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Class 3 Flammable Liquids

Class 3 Flammable Liquids include liquids with flash points at or below 140°F





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 **Combustible Liquids**

Combustible Liquids are liquids that:


- Have flash points greater than 140°F, but less than 200°F AND
- Do not meet the definition of any other hazard class






The DOT typically only regulates Combustibles in bulk packages having a capacity of greater than 119 gallons


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 **Class 4 Flammable Solids, Spontaneously Combustible, and Dangerous When Wet**

Class 4 is divided into three divisions:

- Division 4.1 – Flammable Solids







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 **Class 4 Flammable Solids, Spontaneously Combustible, and Dangerous When Wet**

Class 4 is divided into three divisions:

- Division 4.2 – Spontaneously Combustible Materials









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Class 4 Flammable Solids, Spontaneously Combustible, and Dangerous When Wet

Class 4 is divided into three divisions:

- Division 4.3 – Dangerous When Wet Materials





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Class 5 Oxidizers and Organic Peroxides

Class 5 is divided into two divisions:

- Division 5.1 – Oxidizers
 - Contribute to the combustion of other materials typically by providing oxygen

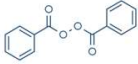


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Class 5 Oxidizers and Organic Peroxides

Class 5 is divided into two divisions:

- Division 5.2 – Organic Peroxides
 - Comprised of an oxidizer and a fuel source



benzoyl peroxide





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Class 6 Poisonous Materials and Infectious Substances

Class 6 is divided into two divisions:

- Division 6.1 – Poisonous Materials



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Class 6 Poisonous Materials and Infectious Substances

Class 6 is divided into two divisions:

- Division 6.2 – Infectious Substances
 - Includes bacteria, viruses, parasites, fungi, and medical wastes



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Class 7 Radioactive Materials

Class 7 Radioactive Materials include:

- Low-level radioactive dyes and reagents
- Highly radioactive nuclear fuels





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 **Class 8 Corrosives**

Class 8 Corrosive Materials include those that:

1. Cause irreversible skin damage within 14 days following an exposure of no more than four hours
2. Corrode steel or aluminum more than 1/4 inch per year

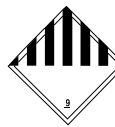





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 **Class 9 Miscellaneous Hazardous Material**

Class 9 Miscellaneous Hazardous Materials are materials that:




- Pose a hazard during transportation
- Do not meet any other hazard class definitions

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 **Class 9 Miscellaneous Hazardous Material**
Examples

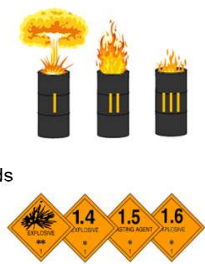
- Materials or items designated by the DOT (e.g., lithium batteries)
- Materials normally regulated by other agencies that are regulated by the DOT when shipped (e.g., RCRA hazardous waste, asbestos, PCBs)

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Determining Subclassifications


- In most cases, the hazard severity is indicated by a material's packing group (PG)
 - PG I = "great" danger
 - PG II = "medium" danger
 - PG III = "minor" danger
- Other subclassifications include generic types for flammable solids and compatibility groups for explosives



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Additional Classification Issues
Multiple-hazard Materials

- A material may exhibit multiple hazards
 - For example, a flammable liquid could also be poisonous and corrosive
- The shipper must know ALL of the hazards, and which is "primary" and which are "subsidiary"

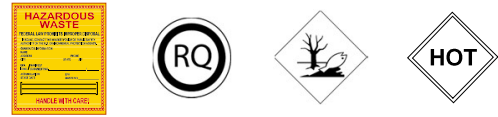


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Additional Classification Issues
Additional Classifications

Shippers must also determine if material is a:

1. Hazardous waste
2. Hazardous substance
3. Marine pollutant
4. Elevated-temperature material




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The DOT's Definition of Hazardous Waste

The DOT has a specific definition of what qualifies as a hazardous waste for shipping purposes.

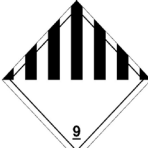
- "Hazardous waste, for the purposes of this chapter, means any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in 40 CFR part 262."



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Classifying Hazardous Wastes

- If either a RCRA or non-RCRA hazardous waste meets the definition of any DOT Hazard Class 1 through 8, then it's assigned to that hazard class
- If it does NOT meet the definition of any DOT Hazard Class 1 through 8, RCRA hazardous waste is assigned to Class 9 by default, but non-RCRA might not be




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The Hazard Classification Process

There are three basic steps to determine the type of hazard:

1. Collect data: identify the properties of the material
2. Consider options: identify possible hazard classes
3. Confirm or deny hazard classes and applicable subclassifications



§§173.117-173.119 [Reserved]

§173.120 Class 3—Definitions.

FLAMMABLE LIQUID AND COMBUSTIBLE LIQUID


Is it a "Flammable Liquid"?

(a) *Flammable liquid*. For the purpose of this subchapter, a *flammable liquid* (Class 3) means a liquid having a flash point of not more than 60°C (140°F), or any material in a liquid phase with a flash point at or above 37.8°C (100°F) that is intentionally heated and offered for transportation or transported at or above its flash point in a bulk packaging, with the following exceptions:

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The Hazard Classification Process
Example: Mineral Spirits

The next several slides will walk through an example on the classification of mineral spirits





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The Hazard Classification Process
Step 1: Collect Data

Mineral spirits display the following physical and chemical properties:

- Liquid
- Flash point: 99°F
- Boiling point: 350°F
- Eye and skin irritant

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The Hazard Classification Process
Step 2: Consider Options

Class and Division	Name and description of class or division	49 CFR reference for definitions	Packing Group
2.1	Flammable gas A gas at 20°C (68°F) or less and burns readily in air.	173.115	N/A
2.2	Non-flammable, non-poisonous compressed gas Gas shipped at a pressure at or over 200 kPa (43.8 psia/29 psig) or as a cryogenic liquid that is neither flammable nor poisonous.	173.115	N/A
2.3	Poisonous gas by inhalation A gas at ≤ 20°C (68°F) and has an LC ₅₀ ≤ 5,000 mL/m ³ (i.e., 0.005% concentration in air will kill half of the animals in a laboratory test).	173.115	Hazard Zone 173.116
3	Flammable liquid Liquid with a flash point ≤ 60°C (140°F). Note: Flash point is the temperature at which a liquid gives off enough vapor to ignite and "flash" back to the liquid surface.	173.120	173.121

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The Hazard Classification Process
Step 3: Confirm or Deny Hazard Classes and Applicable Subclassifications


"A *flammable liquid* (Class 3) means a liquid having a flash point of not more than 60°C (140°F)..."



Mineral spirits has a flash point of 99°F, which is below the cutoff of 140°F, so it is a flammable liquid

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The Hazard Classification Process
Determining the Material's Packing Group




Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		≤ 35°C (95°F)
II	< 23°C (73°F)	> 35°C (95°F)
III	≥ 23°C, ≤ 60°C (≥ 73°F, ≤ 140°F)	> 35°C (95°F)

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The Hazard Classification Process
Determining the Material's Packing Group

PG I: must have a boiling point less than or equal to 35°C (95°F)

Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		≤ 35°C (95°F)
II	< 23°C (73°F)	> 35°C (95°F)
III	≥ 23°C, ≤ 60°C (≥ 73°F, ≤ 140°F)	> 35°C (95°F)




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The Hazard Classification Process
Determining the Material's Packing Group

PG I: mineral spirits has a boiling point of 350°F

- This is above 95°F, so the mineral spirits cannot be a Packing Group I flammable liquid

Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		≤ 35°C (95°F)
II	< 23°C (73°F)	> 35°C (95°F)
III	≥ 23°C, ≤ 60°C (≥ 73°F, ≤ 140°F)	> 35°C (95°F)




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The Hazard Classification Process
Determining the Material's Packing Group

PG II: must have a boiling point over 95°F, and a flash point less than 23°C (73°F)

Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		≤ 35°C (95°F)
II	< 23°C (73°F)	> 35°C (95°F)
III	≥ 23°C, ≤ 60°C (≥ 73°F, ≤ 140°F)	> 35°C (95°F)




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The Hazard Classification Process
Determining the Material's Packing Group

PG II: mineral spirits has a flash point of 99°F

- This is above 73°F, so the mineral spirits cannot be a Packing Group II flammable liquid

Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		≤ 35°C (95°F)
II	< 23°C (73°F)	> 35°C (95°F)
III	≥ 23°C, ≤ 60°C (≥ 73°F, ≤ 140°F)	> 35°C (95°F)




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The Hazard Classification Process
Determining the Material's Packing Group

PG III: flash point must be $\geq 73^{\circ}\text{F}$ (but no greater than 140°F)

Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		$\leq 35^{\circ}\text{C}$ (95°F)
II	$< 23^{\circ}\text{C}$ (73°F)	$> 35^{\circ}\text{C}$ (95°F)
III	$\geq 23^{\circ}\text{C}$, $\leq 60^{\circ}\text{C}$ ($\geq 73^{\circ}\text{F}$, $\leq 140^{\circ}\text{F}$)	$> 35^{\circ}\text{C}$ (95°F)




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The Hazard Classification Process
Determining the Material's Packing Group

PG III: mineral spirits has a flash point of 99°F

- Mineral spirits is a Packing Group III flammable liquid

Packing Group	Flash Point (closed cup)	Initial Boiling Point
I		$\leq 35^{\circ}\text{C}$ (95°F)
II	$< 23^{\circ}\text{C}$ (73°F)	$> 35^{\circ}\text{C}$ (95°F)
III	$\geq 23^{\circ}\text{C}$, $\leq 60^{\circ}\text{C}$ ($\geq 73^{\circ}\text{F}$, $\leq 140^{\circ}\text{F}$)	$> 35^{\circ}\text{C}$ (95°F)




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Hazardous Waste ID



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Waste Identification

Three Steps to Waste ID

1. Is it a waste as defined at 22 CCR 66261.2?
2. Are there any exclusions found at 22 CCR 66261.4?
 - Is it excluded from waste or hazardous waste regulation?
3. Is the material a hazardous waste as defined at 22 CCR 66261.3?

TITLE 22, DIVISION 4.5
Chapter 11—Identification and Listing of Hazardous Waste

Article 1—General

Sec.

66261.1 Purpose and Scope.

66261.2 Definition of Waste.

66261.3 Definition of Hazardous Waste.

66261.4 Exclusions.


66261.6 Requirements for Recyclable Materials.

66261.7 Contaminated Containers.

66261.9 Requirements for Universal Waste.

66261.9.5 Requirements for Treated Wood Waste. [Repealed]

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Step Three: Is It a Hazardous Waste?


Hazardous Waste Defined

The point of generation of a hazardous waste is when it first:

- Exhibits a **characteristic**;
- Meets a **listed** description; or
- Is **mixed** with a listed hazardous waste




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Characteristic Hazardous Wastes

Four generic properties, or *characteristics*, can cause a waste to be regulated as hazardous waste:

1. Ignitability
2. Corrosivity
3. Reactivity
4. Toxicity







RCRA characteristic wastes are assigned "D" codes

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The Intersection of DOT Classification With the RCRA and Non-RCRA Characteristics

Listed Hazardous Waste

The hazardous waste lists are “descriptive”

- In general, if a material is described on one of the lists, then it is a hazardous waste regardless of its actual properties



The following wastes are listed hazardous wastes from specific sources unless they are excluded pursuant to 40 CFR sections 260.20 and 260.22.

Industry and EPA Hazardous Waste No.	Hazardous Waste	Hazard Code
W001	bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use croosote and/or pentachlorophenol	(T)
K002	inorganic pigments	
K003	wastewater treatment sludge from the production of chrome yellow and orange pigments	(T)
K004	wastewater treatment sludge from the production of molybdate orange pigments	(T)
K005	wastewater treatment sludge from the production of iron yellow pigments	(T)
K006	wastewater treatment sludge from the production of chrome green pigments	(T)
K007	wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)	(T)
K008	wastewater treatment sludge from the production of iron blue pigments	(T)
K009	oven residue from the production of chrome oxide green pigments	(T)
U010	organic chemicals	
U011	distillation bottoms from the production of acetaldehyde from ethylene	(T)
U012	distillation side cuts from the production of acetaldehyde from ethylene	(T)

Hazardous Waste Identification

RCRA and Non-RCRA Hazardous Wastes

- RCRA hazardous wastes are Federally defined hazardous wastes
- Non-RCRA hazardous wastes are California-defined hazardous wastes





Hazardous Waste Identification

RCRA vs. Non-RCRA Hazardous Wastes

A waste CANNOT be both a RCRA hazardous waste AND a non-RCRA hazardous waste at the same time



- If a waste is determined to be a RCRA hazardous waste, there is no need to determine if it meets criteria for non-RCRA hazardous waste
- If a waste is determined NOT to be a RCRA hazardous waste, the generator must determine if it's a non-RCRA hazardous waste per California's additional regulations



RCRA Characteristic Hazardous Wastes
Ignitability Characteristic: D001

A material is ignitable if it is:

1. A liquid with a flash point < 140°F
2. A non-liquid that causes fire and burns vigorously
3. An ignitable compressed gas
4. An oxidizer




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RCRA Characteristic Hazardous Wastes
Corrosivity Characteristic: D002

A material is corrosive if it is:

1. Aqueous and has a pH ≤ 2 or ≥ 12.5 ; or
2. A liquid that corrodes steel at a rate greater than 0.25 inches per year




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RCRA Characteristic Hazardous Wastes
Reactivity Characteristic: D003

There are eight properties that cause a material to be reactive:

1. Normally unstable and undergoes violent change without detonating
2. Reacts violently with water
3. Forms potentially explosive mixtures with water
4. Produces toxic gases when mixed with water




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RCRA Characteristic Hazardous Wastes
Reactivity Characteristic: D003

There are eight properties that cause a material to be reactive:

5. Cyanide- or sulfide-containing waste that releases toxic gases within specific pH ranges
6. Capable of detonation when struck or heated
7. Capable of detonation at standard temperature and pressure
8. Specified DOT explosives





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RCRA Characteristic Hazardous Wastes
Toxicity Characteristic: D004–D043

The toxicity characteristic includes any wastes that leach one or more constituents listed in Table 1 of 22 CFR 66261.24 at or above specific regulatory levels, including certain:

- Metals
- Pesticides
- Volatile organics (e.g., benzene)

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Table 1 [22 CFR 66261.24]
The “TCLP” Table—Excerpt

EPA HW No. ¹	Contaminant	CAS No. ²	Leachable Concentration Regulatory Level (mg/L)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

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Non-RCRA Characteristic Hazardous Wastes

There are two non-RCRA hazardous waste characteristics:

1. Corrosivity
2. Toxicity




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Non-RCRA Characteristic Hazardous Wastes
Corrosivity Characteristic

A material is considered a non-RCRA corrosive hazardous waste if it is not aqueous or a liquid but when mixed with equal parts water will produce a solution that:

1. Has a pH ≤ 2 or ≥ 12.5 , OR
2. Corrodes steel at a rate > 0.25 inches per year





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Non-RCRA Characteristic Hazardous Wastes
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, based on:

- LD₅₀ or LC₅₀ values
- Specific carcinogens
- Experience/testing
- Waste extraction test (WET)




Vinyl chloride

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Non-RCRA Characteristic Hazardous Wastes
Toxicity Characteristic: LD₅₀ and LC₅₀ Values

A waste is a non-RCRA toxicity waste if it has an:


- Acute oral LD₅₀ < 2,500 mg/kg
- Acute dermal LD₅₀ < 4,300 mg/kg
- Acute inhalation LC₅₀ < 10,000 ppm
- Acute aquatic 96-hour LC₅₀ < 500 mg/L



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Non-RCRA Characteristic Hazardous Wastes
Toxicity Characteristic: Carcinogens


A waste is a non-RCRA toxicity waste if it contains a single or combined total concentration equal to or greater than 0.001% by weight of 16 specific chemicals known or suspected to be carcinogens



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Non-RCRA Characteristic Hazardous Wastes
Toxicity Characteristic: Experience/Testing

A waste is a non-RCRA toxicity waste if it has been shown through experience or testing to pose hazards to human health or the environment because of its carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties, or persistence in the environment




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Non-RCRA Characteristic Hazardous Wastes

Toxicity Characteristic: Waste Extraction Test (WET)

A waste is a non-RCRA toxicity waste if it equals or exceeds the TTLC or STLC limit identified for a particular constituent



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TTLC and STLC Limits

Table II. List of Inorganic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) Values

Substance ^{a,b}	STLC mg/l	TTLC Wet-Weight mg/kg
Antimony and/or antimony compounds	15	500
Arsenic and/or arsenic compounds	5.0	500
Asbestos	1.0 (as percent)	
Barium and/or barium compounds (excluding barite)	100	10,000 ^c
Beryllium and/or beryllium compounds	0.75	75
Cadmium and/or cadmium compounds	1.0	100
Chromium (VI) compounds	5	500
Chromium and/or chromium (III) compounds	5 ^d	2,500
Cobalt and/or cobalt compounds	80	8,000


Table III. List of Organic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) Values

Substance	STLC mg/l	TTLC Wet-Weight mg/kg
Aldrin	0.14	1.4
Chlordane	0.25	2.5
DDT, DDE, DDD	0.1	1.0
2,4-Dichlorophenoxyacetic acid (2,4-D)	10	100
Dieldrin	0.8	8.0
Dioxin (2,3,7,8-TCDD)	0.001	0.01
Endrin	0.02	0.2
Heptachlor	0.67	6.7
Heptachlor epoxide	2.1	21
Lead compounds, organic	—	13
Lindane	0.4	4.0
Methoxychlor	10	100
Mirex	2.1	21
Pentachlorophenol	1.7	17

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The Waste Extraction Test

The Waste Extraction Test (WET) is similar to the TCLP in that both produce a leachate containing specified constituents



Test methods are not identical, and results are not interchangeable

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Identifying a Waste as Hazardous Based on TTLC and STLC Values

If Total Concentration \geq TTLC \rightarrow Non-RCRA Toxicity
 If WET \geq STLC \rightarrow Non-RCRA Toxicity
 If Total Concentration $<$ TTLC and STLC (WET) $<$ STLC (Tables) \rightarrow **NOT** Non-RCRA Toxicity
 If Total Concentration $<$ TTLC and $\geq 10 \times$ STLC \rightarrow **MAYBE** Non-RCRA Toxicity

Table II. List of Inorganic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) Values

Substance ^a	STLC mg/l	TTLC Wet-Weight mg/kg
Antimony and/or antimony compounds	15	500
Arsenic and/or arsenic compounds	5.0	500
Asbestos	1.0 (as percent)	
Barium and/or barium compounds (excluding barites)	100	10,000
Beryllium and/or beryllium compounds	0.25	75

Table III. List of Organic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) Values

Substance	STLC mg/l	TTLC Wet-Weight mg/kg
Aldrin	0.14	1.4
Chlordane	0.25	2.5
DDT, DDE, DDD	0.1	1.0
2,4-Dichlorophenoxyacetic acid (2,4-D)	10	100
Dieldrin	0.8	8.0
Dioxin (2,3,7,8-TCDD)	0.001	0.01
Endrin	0.02	0.2

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Comparing Characteristics to Classes/Divisions Examples

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Examples

Ignitability Characteristic

A material is ignitable if it is:


1. A liquid with a flash point $<$ 140°F. Under the DOT HMR, a liquid with a flash point \leq 140°F is a _____.

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Examples
Ignitability Characteristic

A material is ignitable if it is:

1. A liquid with a flash point < 140°F. Under the DOT HMR, a liquid with a flash point ≤ 140°F is a [Class 3 Flammable Liquid](#)




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Examples
Ignitability Characteristic

A material is ignitable if it is:

2. A non-liquid that causes fire and burns vigorously. Under the DOT HMR, it could fall into _____ or _____, which have more specific test procedures





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Examples
Ignitability Characteristic

A material is ignitable if it is:

2. A non-liquid that causes fire and burns vigorously. Under the DOT HMR, it could fall into [Division 4.1](#) or [Division 4.2](#), which have more specific test procedures




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Examples
Ignitability Characteristic

A material is ignitable if it is:

3. An ignitable compressed gas. Under the DOT HMR, it would fall into _____




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Examples
Ignitability Characteristic

A material is ignitable if it is:

3. An ignitable compressed gas. Under the DOT HMR, it would fall into [Division 2.1 Flammable Gases](#)




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Examples
Ignitability Characteristic

A material is ignitable if it is:

4. An oxidizer. Under the DOT HMR, it could fall into _____, which has a more specific designation




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Examples
Ignitability Characteristic

A material is ignitable if it is:

- 4. An oxidizer. Under the DOT HMR, it could fall into [Division 5.1 Oxidizers](#), which has a more specific designation

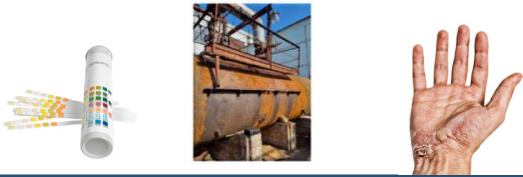


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Examples
Corrosivity Characteristic

RCRA D002 and non-RCRA corrosivity both use pH and steel corrosion

- The DOT Hazard _____ is based on irreversible skin destruction and the corrosion of steel AND _____




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Examples
Corrosivity Characteristic

RCRA D002 and non-RCRA corrosivity both use pH and steel corrosion

- The DOT Hazard [Class 8 Corrosive materials](#), is based on irreversible skin destruction and the corrosion of steel AND _____




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Examples
Corrosivity Characteristic

RCRA D002 and non-RCRA corrosivity both use pH and steel corrosion


- The DOT Hazard **Class 8 Corrosive materials**, is based on irreversible skin destruction and the corrosion of steel AND [aluminum](#)



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Examples
Reactivity Characteristic


While there are eight properties that can cause the RCRA D003 characteristic of reactivity, they do **not** include specific tests and will **not** line up with the DOT's hazard classes



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Examples
Reactivity Characteristic


- Several of the properties do involve reacting with water, therefore you might assign a RCRA D003 to _____ under the DOT HMR



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Examples
Reactivity Characteristic


- Several of the properties do involve reacting with water, therefore you might assign a RCRA D003 to [Division 4.3 Dangerous When Wet materials](#) under the DOT HMR



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Examples
Reactivity Characteristic


- Other RCRA D003 reactivity criteria include both DOT forbidden explosives and explosives in Divisions _____, _____, and _____



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Examples
Reactivity Characteristic

- Other RCRA D003 reactivity criteria includes both DOT forbidden explosives and explosives in Divisions [1.1](#), [1.2](#), and [1.3](#)




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Examples
Toxicity Characteristic

The RCRA toxicity criteria for D004–D043 and the DOT’s Division 6.1 Poisonous materials do not share the same testing methodology

- The DOT does, however, assign materials that do not meet any other class definition to




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Examples
Toxicity Characteristic

The RCRA toxicity criteria for D004-D043 and the DOT’s Division 6.1 Poisonous materials do not share the same testing methodology

- The DOT does, however, assign materials that do not meet any other class definition to [Class 9 Miscellaneous Hazardous materials](#)



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Examples
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, which fall into 4 main categories:

- Materials that are toxic based on LD₅₀ or LC₅₀ values, ONLY if sufficiently toxic would be assigned to _____ under the DOT HMR

Packing group	Oral toxicity LD ₅₀ (mg/kg)	Dermal toxicity LD ₅₀ (mg/kg)	Inhalation toxicity by dusts and mists LC ₅₀ (mg/L)
I	≤5.0	≤50	≤0.2
II	>5.0 and ≤50	>50 and ≤200	>0.2 and ≤2.0
III	>50 and ≤300	>200 and ≤1000	>2.0 and ≤4.0

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Examples
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, which fall into four main categories:

1. Materials that are toxic based on LD₅₀ or LC₅₀ values, ONLY if sufficiently toxic would be assigned to [Division 6.1 Poisonous materials](#) under the DOT HMR

A diamond-shaped label with a skull and crossbones in the center, the word "POISON" below it, and the number "6" at the bottom.

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Examples
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, which fall into four main categories:

2. The 16 carcinogens are found on Appendix A to 49 CFR 172.101, so if they meet the DOT's definition of a "hazardous substance" and are not Class 1–8 materials, they would then be assigned

Hazardous substance	Reportable quantity (RQ) pounds (kilograms)
A2213	5000 (2270)
Acrylonitrile	100 (45.4)
Acrylonitrile	5000 (2270)
Acrylonitrile	1000 (454)

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Examples
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, which fall into four main categories:

2. The 16 carcinogens are found on Appendix A to 49 CFR 172.101, so if they meet the DOT's definition of a "hazardous substance" and are not Class 1–8 materials, they would then be assigned [Class 9 Miscellaneous Hazardous materials](#)


A diamond-shaped label with vertical black and white stripes and the number "9" at the bottom.

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Examples
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, which fall into four main categories:

3. Things that presumed to be toxic based on experience/testing have **no** corresponding hazard classes under the DOT HMR




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Examples
Toxicity Characteristic

There are seven ways that a material can be considered a non-RCRA toxicity waste, which fall into four main categories:


4. Waste extraction test (WET) has no similar procedure in the DOT HMR, so must be evaluated solely by other criteria
 - For example, **asbestos wastes** could be regulated for other reasons



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The Hazardous Material Classification of Hazardous Wastes


The DOT defines hazardous waste as any material that the EPA requires be shipped off site using a _____ under the rules at _____



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The Hazardous Material Classification of Hazardous Wastes

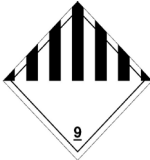
The DOT defines hazardous waste as any material that the EPA requires be shipped off site using a [Uniform Hazardous Waste Manifest](#) under the rules at [40 CFR 262](#)



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Hazardous Material Classification
RCRA Hazardous Wastes

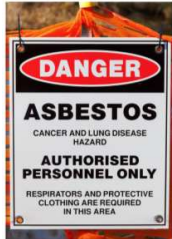
- If a RCRA hazardous waste meets the definition of any DOT Hazard Class 1 through 8, then it's assigned to that hazard class
- If it does NOT meet the definition of any DOT Hazard Class 1 through 8, then it's assigned to Class 9 by default




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Hazardous Material Classification
Non-RCRA Hazardous Wastes

- If a non-RCRA hazardous waste meets the definition of any DOT Hazard Class 1 through 8, then it's assigned to that hazard class
- If it does NOT meet the definition of any DOT Hazard Class 1 through 8, then it's assigned to Class 9 ONLY if it meets the definition of a Class 9





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 **The Importance of Coordination**
Conclusion

In addition to hazardous waste identification and hazardous material classification it is important to coordinate these programs in other steps, such as:

- During storage
- Assigning Proper Shipping Names
- Using the Uniform Hazardous Waste Manifest
- "Wastes of Concern"


 

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 **The Importance of Coordination**
During Storage

Using the correct package during storage can:

- Reduce the risk transfer incidents
- Comply with air emission standards



Air emission standards only apply to containers in the CAA for LGQ, if high VOC, in containers with a capacity greater than 26.4 gallons

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 **The Importance of Coordination**
During Storage

- The DTSC requires that containers be marked with the composition and physical state of the waste
 - If using US DOT labels for both storage and shipping purposes they would need to be accurate under both

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The Importance of Coordination
Naming


RCRA Hazardous Wastes	Non-RCRA Hazardous Wastes That Meet a DOT Hazard Class Definition	Non-RCRA Hazardous Wastes That Do NOT Meet a DOT Hazard Class Definition
172.101 Table Add "waste" to PSN	172.101 Table Don't add "waste"	Use generic phrase & name Don't add "waste"
		

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The Importance of Coordination
The Uniform Hazardous Waste Manifest

The manifest is used to ship and track hazardous waste shipments

- The US EPA requires that RCRA hazardous wastes are manifested
- The DTSC requires that *both* RCRA and non-RCRA hazardous waste are manifested
- The DOT has specific shipping paper requirements for hazardous materials



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The Importance of Coordination
The Uniform Hazardous Waste Manifest

10. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	13. Containers		11. Total Quantity	12. Unit Wt/Vol	13. Waste Codes		
	No.	Type			1	2	3
X 1 UN 1090; Waste Acetone; 3; PG II	10	DM	3,400	P	F003	D001	1212
RO 2 NA 3077; Hazardous Waste, Solid, n.o.s.; 9; PG III (D008)	2	DM	1,050	P	D008	491	
X 3 UN 1823; Sodium Hydroxide, Solid, 8; PG II	4	DF	200	P	141		
4 Non-RCRA Hazardous Waste, Liquid, Plating Waste	4	DM	2,600	P	726		

14. Special Handling Instructions and Additional Information
The above weights are net weights.

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The Importance of Coordination
The Uniform Hazardous Waste Manifest

When signing the manifest, you are certifying that you have met ALL applicable regulations

15. GENERATOR/SHIPPER'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/consolidated, and are in full compliance with applicable international and national governmental regulations. I report incorrect and/or are the Primary Exporter. I certify that the waste reconciliation statement described in 49 CFR 162.27(a), (f) is a large quantity generator or (g), (h) is a small quantity generator is true.			
Generator/Shipper's Printed Name	Signature	Month	Day
Andrea Carter	Andrea Carter	09	01
16. International Shipments: <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: Date leaving U.S.:			
17. Transporter Acknowledgment of Receipt of Materials			
Transporter 1 Printed Name	Signature	Month	Day
Justin DeSalvo	Justin DeSalvo	09	01
Transporter 2 Printed Name	Signature	Month	Day
Samantha Smith	Samantha Smith	09	12




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The Importance of Coordination
Hazardous Wastes of Concern

A hazardous waste of concern is a hazardous waste that meets any of the following US DOT hazard divisions:

- Explosive Hazard Divisions 1.1, 1.2, or 1.3
- Poisonous liquid or solid Hazard Division 6.1, Packing Groups I or II
- Poisonous gas Hazard Division 2.3

Discrepancies on the manifest are subject to special reporting requirements






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The Importance of Coordination
Hazardous Wastes of Concern

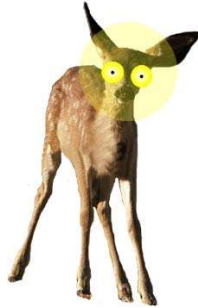
If there is no reconciliation after 24 hours, the TSDF:

- Must immediately notify the DTSC by phone
- Must report the discrepancy in writing to the DTSC within five days



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 **Any Questions?**



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 **Thank You for Attending**

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