U.S. Department of Transportation

Pipeline and Hazardous Materials Safety Administration

HAZARDOUS MATERIALS REGULATIONS

STUDENT WORKBOOK

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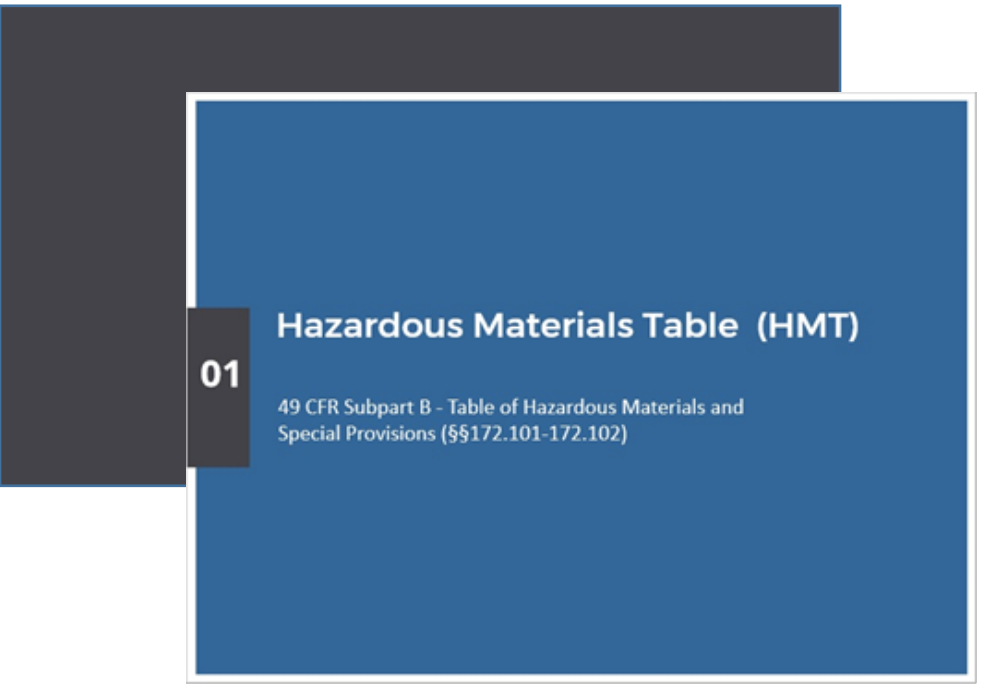
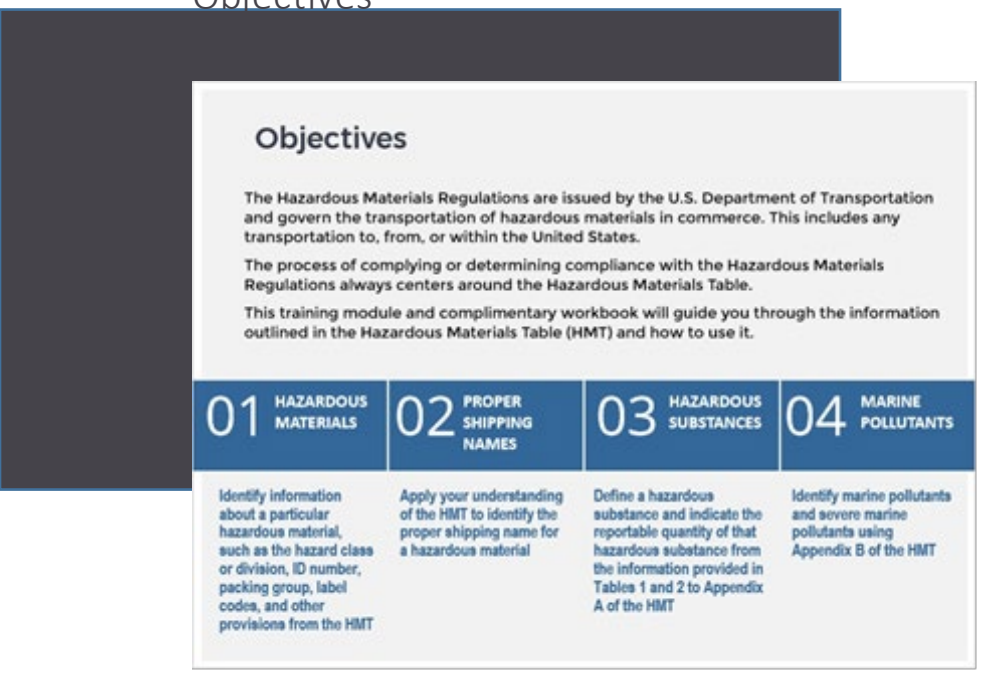
1.0 - HAZARDOUS MATERIALS TABLE

Table of Contents

Module 1: Hazardous Materials Table



Objectives

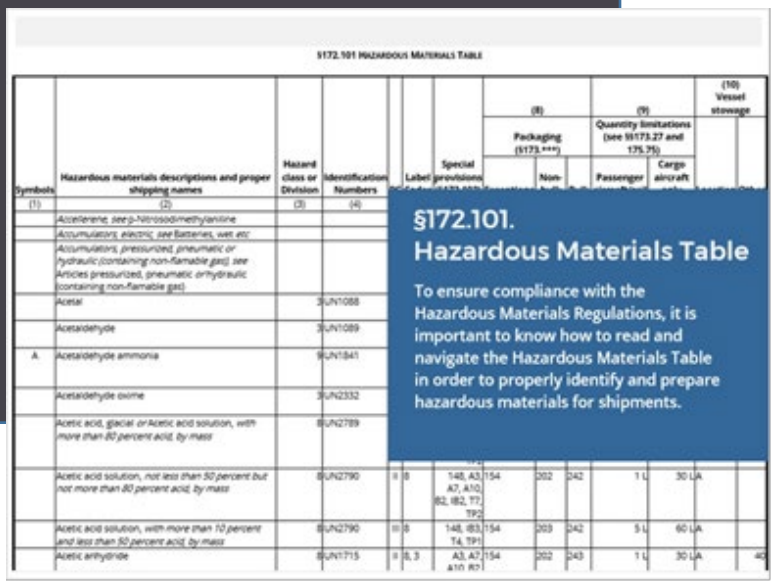


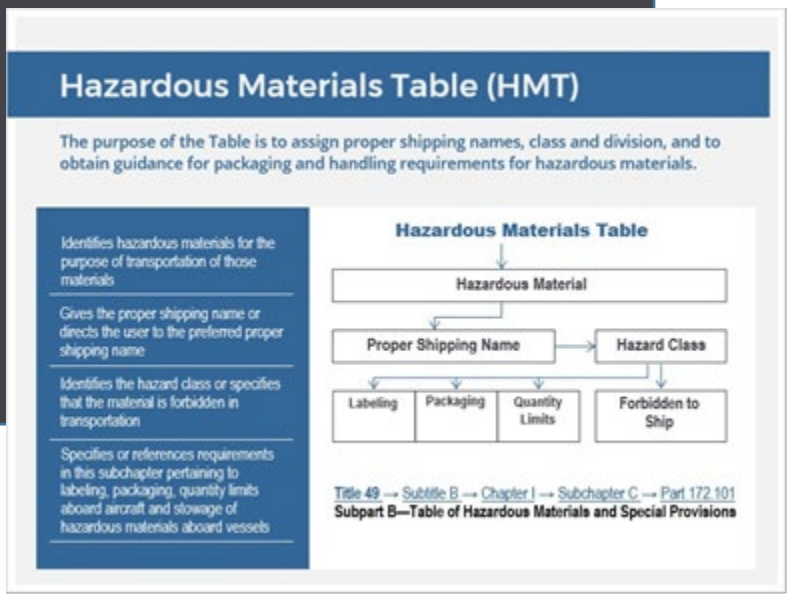
NARRATION:

The Hazardous Materials Table can be located in 49 CFR Subpart B - Table of Hazardous Materials and Special Provisions (§§172.101-172.102).

The Hazardous Materials Regulations are issued by the U.S. Department of Transportation and govern the transportation of hazardous materials in commerce. This includes any transportation to, from, or within the United States. The process of complying or determining compliance with the Hazardous Materials Regulations always centers around the Hazardous Materials Table. This training workbook will guide you through the information outlined in the Hazardous Materials Table (HMT) and how to use it.

We will review how to properly identify hazardous materials and compile proper shipping names. Also, you will learn how to identify hazardous substances and marine pollutants.





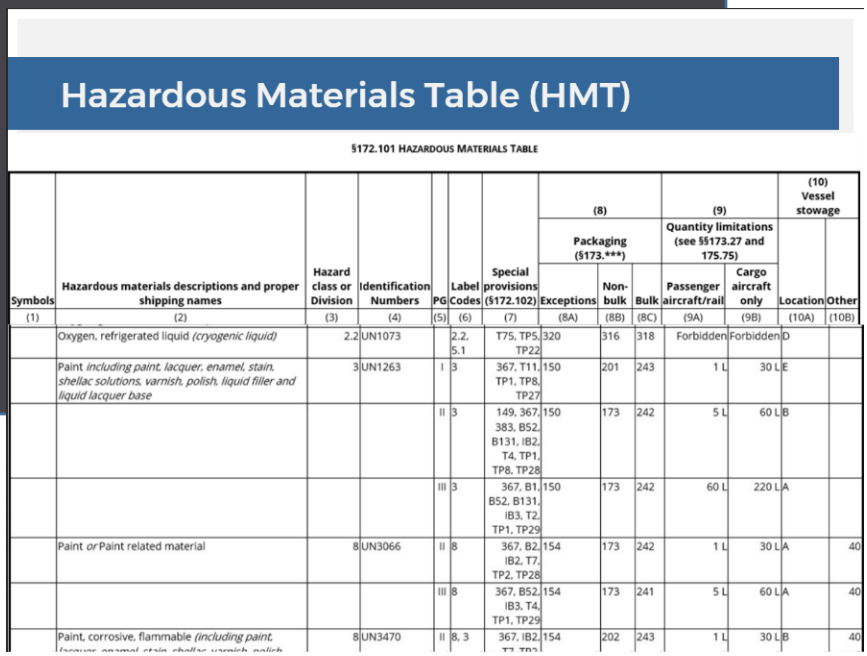
NARRATION:

To ensure compliance with the Hazardous Materials Regulations, it is important to know how to read and navigate the Hazardous Materials Table in order to properly identify and prepare hazardous materials for shipments.

The Hazardous Materials Table in §172.101 identifies hazardous materials for the purpose of transportation of those materials.

- Gives the proper shipping name or directs the user to the preferred proper shipping name
- Identifies the hazard class or specifies that the material is forbidden in transportation
- Specifies or references requirements in this subchapter pertaining to labeling, packaging, quantity limits aboard aircraft and stowage of hazardous materials aboard vessels

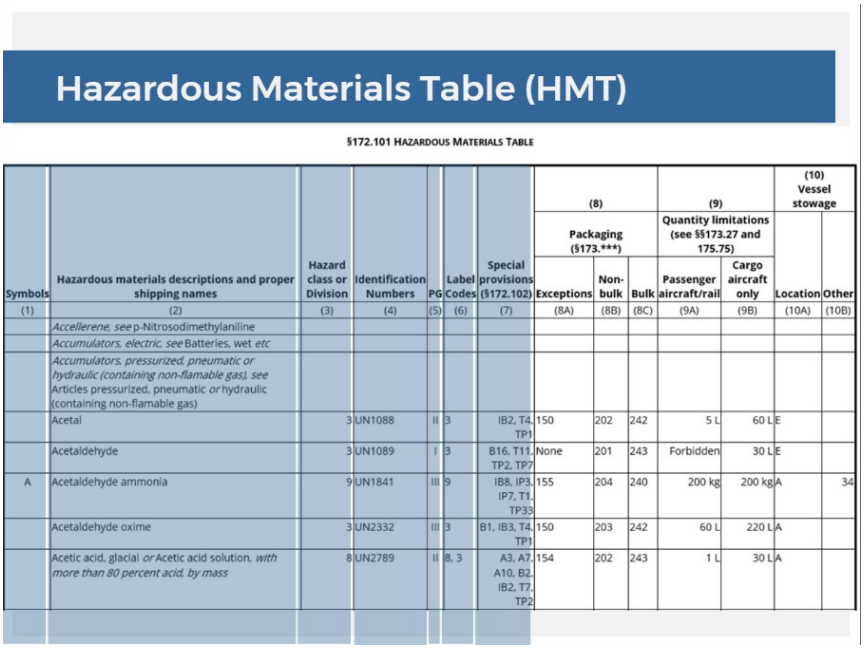
In other words, the purpose of the Table is to assign proper shipping names, class and division, and to obtain guidance for packaging and handling requirements for hazardous materials.



Hazardous Materials Table (HMT)

§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Oxygen, refrigerated liquid *(cryogenic liquid)*	2.2	UN1073		2.2, 5.1	T75, TP5, TP22	320	316	318	Forbidden	Forbidden	D	
	Paint *including paint, lacquer, enamel, stain, shellac solutions, varnish, polish, liquid filler and liquid lacquer base*	3	UN1263	I	3	367, T11, TP1, TP8, TP27	150	201	243	1 L	30 L	E	
				II	3	149, 367, 383, B52, B131, IB2, T4, TP1, TP8, TP28	150	173	242	5 L	60 L	B	
				III	3	367, B1, B52, B131, IB3, T2, TP1, TP29	150	173	242	60 L	220 L	A	
	Paint *or* Paint related material	8	UN3066	II	8	367, B2, IB2, T7, TP2, TP28	154	173	242	1 L	30 L	A	40
				III	8	367, B52, IB3, T4, TP1, TP29	154	173	241	5 L	60 L	A	40
	Paint, corrosive, flammable *(including paint, lacquer, enamel, stain, shellac, varnish, polish,*	8	UN3470	II	8, 3	367, IB2, T7, TP2	154	202	243	1 L	30 L	B	40



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§172.101 HAZARDOUS MATERIALS TABLE

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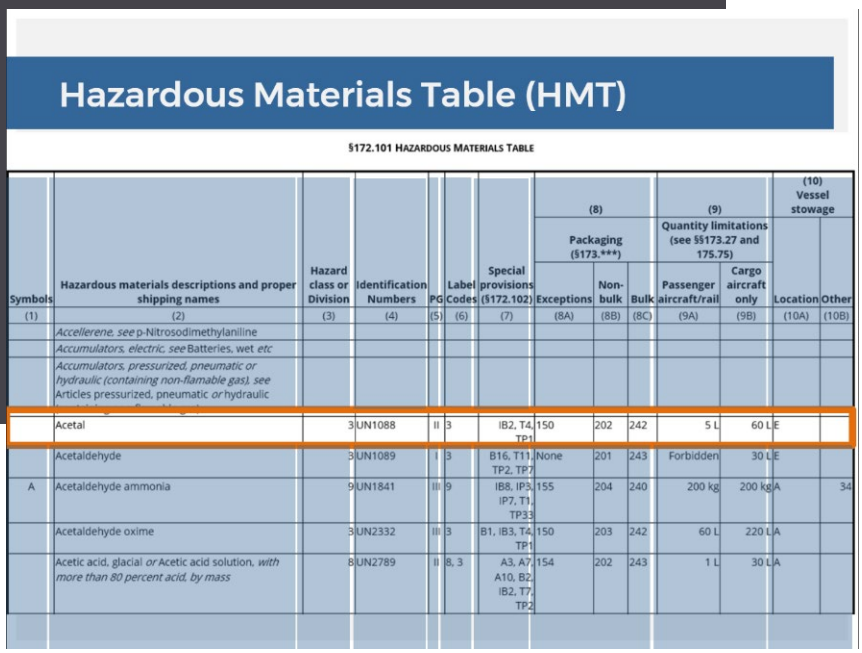
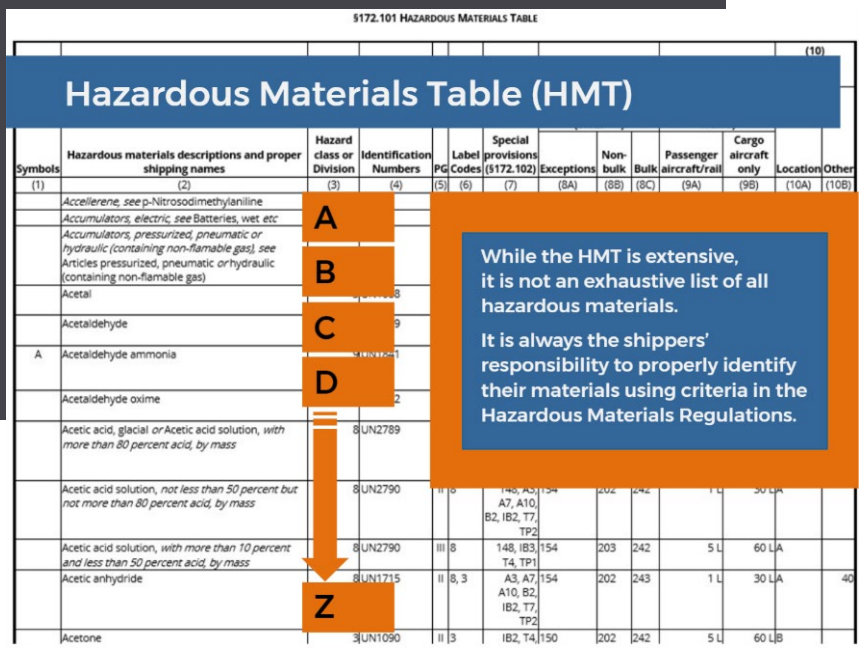
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Accellerene, see p-Nitrosodimethylaniline												
	Accumulators, electric, see Batteries, wet *etc*												
	Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas), see Articles pressurized, pneumatic *or* hydraulic (containing non-flamable gas)												
	Acetal	3	UN1088	II	3	IB2, T4, TP1	150	202	242	5 L	60 L	E	
	Acetaldehyde	3	UN1089	I	3	B16, T11, TP2, TP7	None	201	243	Forbidden	30 L	E	
A	Acetaldehyde ammonia	9	UN1841	III	9	IB8, IP3, IP7, T1, TP33	155	204	240	200 kg	200 kg	A	34
	Acetaldehyde oxime	3	UN2332	III	3	B1, IB3, T4, TP1	150	203	242	60 L	220 L	A	
	Acetic acid, glacial *or* Acetic acid solution, *with more than 80 percent acid, by mass*	8	UN2789	II	8, 3	A3, A7, A10, B2, IB2, T7, TP2	154	202	243	1 L	30 L	A	

NARRATION:

Over 3,000 commonly transported hazardous materials are **identified and listed** alphabetically by the proper shipping name in the Hazardous Materials Table.

The HMT uses **columns** to reference **requirements** pertaining to labeling, packaging, and quantity limits aboard aircraft, and stowage requirements for vessels.



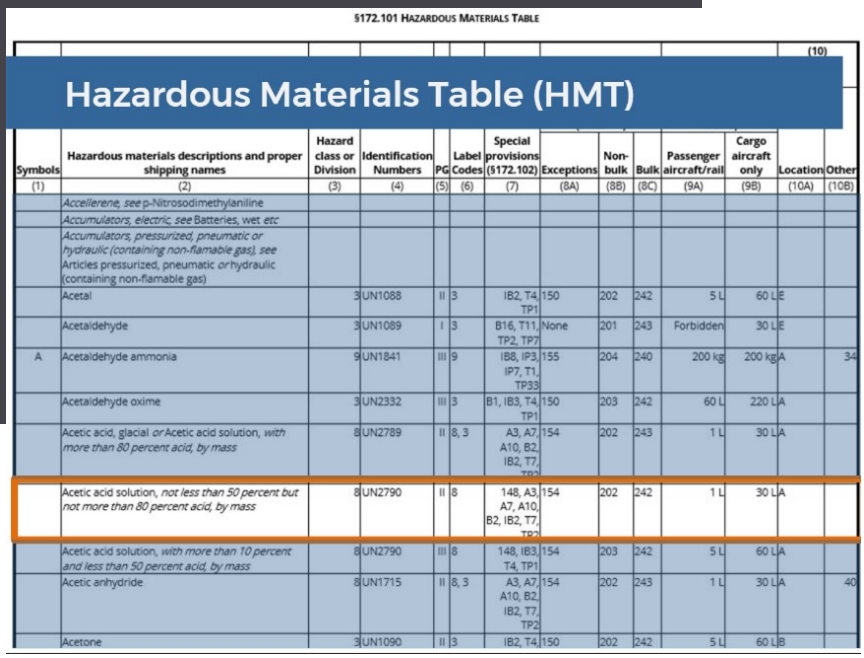


NARRATION:

Each row in the HMT contains **information** specific to each hazardous material.

Let's review the principles of the Hazardous Materials Table organization.

All hazardous materials are listed **alphabetically**. Please note that while the HMT is extensive,
It is not an exhaustive list of all hazardous materials.



§172.101 HAZARDOUS MATERIALS TABLE

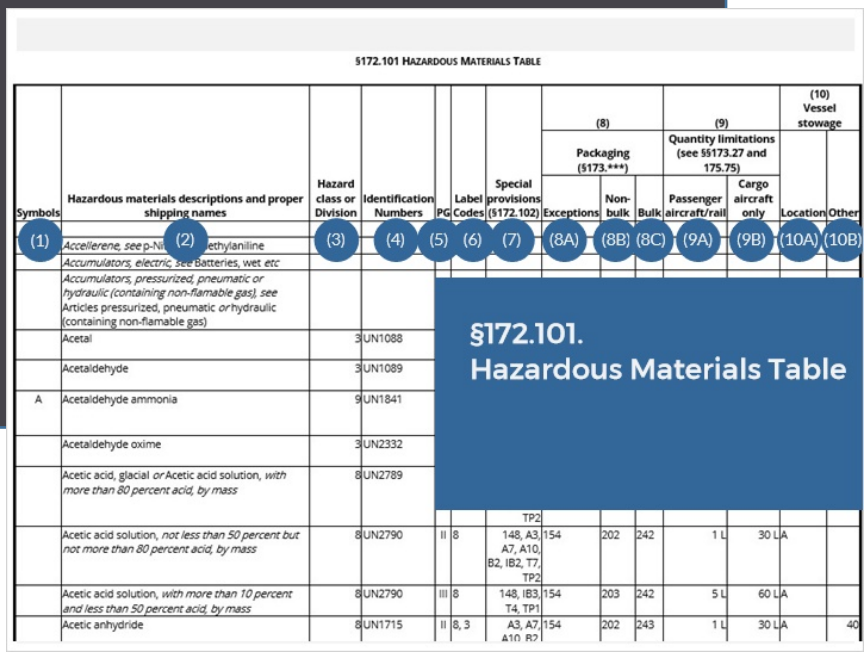
Hazardous Materials Table (HMT)

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(10) Exceptions	Non-bulk	Bulk	Passenger aircraft/rail	Cargo aircraft only	Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Accellerene, see p-Nitrosodimethylaniline												
	Accumulators, electric, see Batteries, wet *etc*												
	Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas), see Articles pressurized, pneumatic *or* hydraulic (containing non-flamable gas)												
	Acetal	3	UN1088	II	3	IB2, T4, TP1	150	202	242	5 L	60 L	E	
	Acetaldehyde	3	UN1089	I	3	B16, T11, TP2, TP7	None	201	243	Forbidden	30 L	E	
A	Acetaldehyde ammonia	9	UN1841	III	9	IB8, IP3, IP7, T1, TP33	155	204	240	200 kg	200 kg	A	34
	Acetaldehyde oxime	3	UN2332	III	3	B1, IB3, T4, TP1	150	203	242	60 L	220 L	A	
	Acetic acid, glacial *or* Acetic acid solution, *with more than 80 percent acid, by mass*	8	UN2789	II	8, 3	A3, A7, A10, B2, IB2, T7, TP2	154	202	243	1 L	30 L	A	
	Acetic acid solution, *not less than 50 percent but not more than 80 percent acid, by mass*	8	UN2790	II	8	148, A3, A7, A10, B2, IB2, T7, TP2	154	202	242	1 L	30 L	A	
	Acetic acid solution, *with more than 10 percent and less than 50 percent acid, by mass*	8	UN2790	III	8	148, IB3, T4, TP1	154	203	242	5 L	60 L	A	
	Acetic anhydride	8	UN1715	II	8, 3	A3, A7, A10, B2, IB2, T7, TP2	154	202	243	1 L	30 L	A	40
	Acetone	3	UN1090	II	3	IB2, T4,	150	202	242	5 L	60 L	B	

NARRATION:

It is always the **shippers' responsibility** to properly identify their materials using criteria in the Hazardous Materials Regulations.

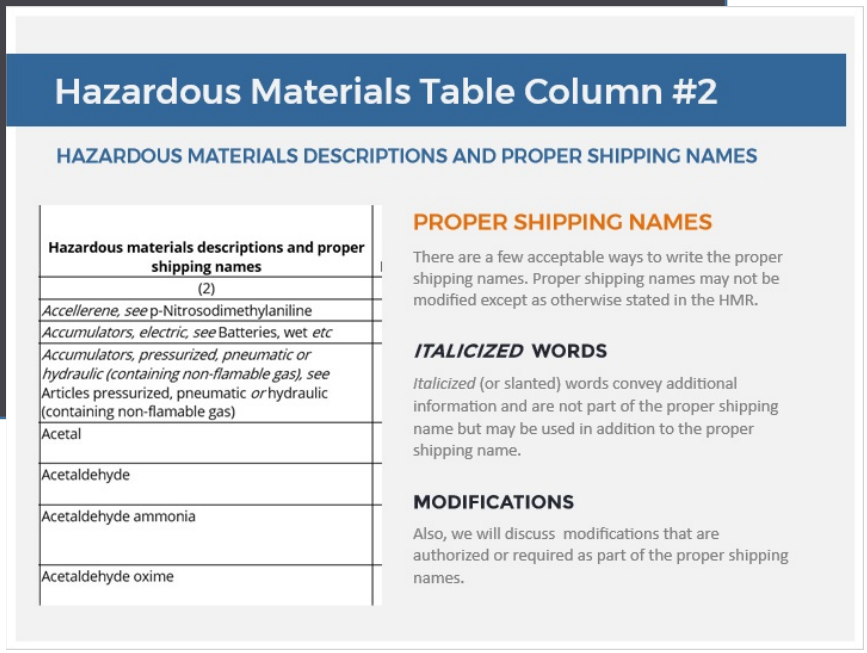
Each row contains information specific to each hazardous material.



§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	(8) Packaging (§173.***) Non-bulk	(8) Packaging (§173.***) Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	(9) Quantity limitations (see §§173.27 and 175.75) Cargo aircraft only	(10) Vessel stowage Location	(10) Vessel stowage Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Accellerene, see p-Nitrosodimethylaniline												
	Accumulators, electric, see Batteries, wet *etc*												
	Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas), see Articles pressurized, pneumatic *or* hydraulic (containing non-flamable gas)												
	Acetal	3	UN1088										
	Acetaldehyde	3	UN1089										
A	Acetaldehyde ammonia	9	UN1841										
	Acetaldehyde oxime	3	UN2332										
	Acetic acid, glacial *or* Acetic acid solution, *with more than 80 percent acid, by mass*	8	UN2789			TP2							
	Acetic acid solution, *not less than 50 percent but not more than 80 percent acid, by mass*	8	UN2790	II	8	148, A3, A7, A10, B2, IB2, T7, TP2	154	202	242	1 L	30 L	A	
	Acetic acid solution, *with more than 10 percent and less than 50 percent acid, by mass*	8	UN2790	III	8	148, IB3, T4, TP1	154	203	242	5 L	60 L	A	
	Acetic anhydride	8	UN1715	II	8, 3	A3, A7, A10, B2	154	202	243	1 L	30 L	A	40

§172.101. Hazardous Materials Table



Hazardous Materials Table Column #2

HAZARDOUS MATERIALS DESCRIPTIONS AND PROPER SHIPPING NAMES

Hazardous materials descriptions and proper shipping names
(2)
Accellerene, see p-Nitrosodimethylaniline
Accumulators, electric, see Batteries, wet *etc*
Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas), see Articles pressurized, pneumatic *or* hydraulic (containing non-flamable gas)
Acetal
Acetaldehyde
Acetaldehyde ammonia
Acetaldehyde oxime

PROPER SHIPPING NAMES

There are a few acceptable ways to write the proper shipping names. Proper shipping names may not be modified except as otherwise stated in the HMR.

***ITALICIZED* WORDS**

Italicized (or slanted) words convey additional information and are not part of the proper shipping name but may be used in addition to the proper shipping name.

MODIFICATIONS

Also, we will discuss modifications that are authorized or required as part of the proper shipping names.

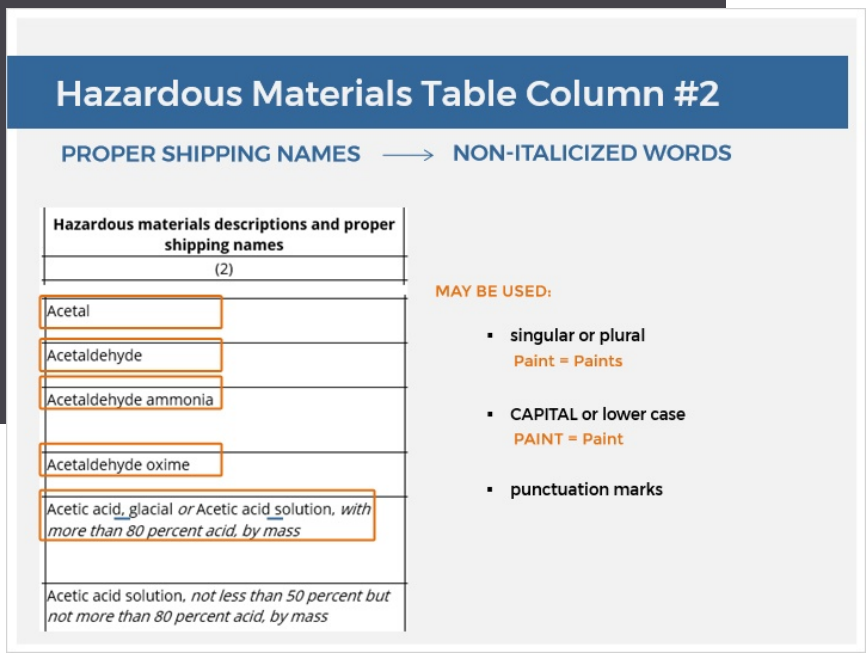
NARRATION:

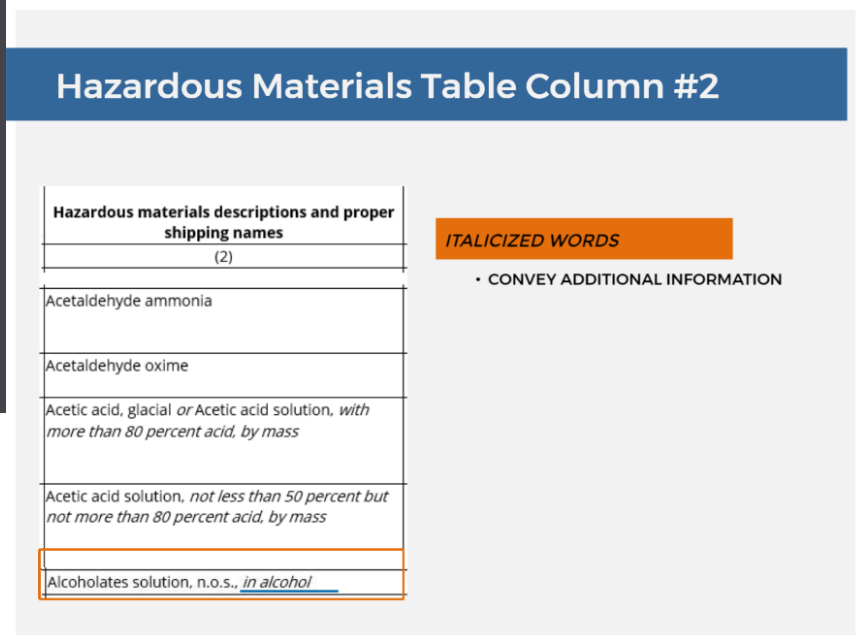
Now, we will review all 10 columns of the Hazardous Materials Table. Since the hazardous materials are listed by name in the column #2, let's start reviewing it first.

The second column of the HMT table is labeled "Hazardous materials descriptions and proper shipping names." It lists the proper shipping names and any applicable additional information.

In this segment we will review: a few acceptable ways to write the proper shipping names. Proper shipping names may not be modified except as otherwise stated in the HMR.

Italicized (or slanted) words convey additional information and are not part of the proper shipping name but may be used in addition to the proper shipping name. Also, we will discuss modifications that are authorized or required as part of the proper shipping names.





NARRATION:

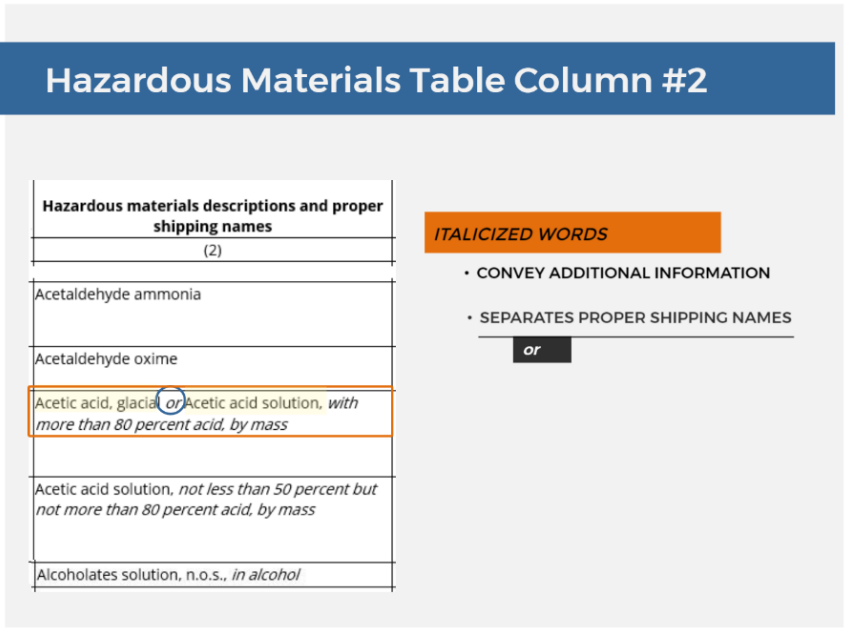
Column 2 includes proper shipping names. Only **non-italicized** words are part of the proper shipping name. Words in italics may be used in addition to the proper shipping name. Please see the highlighted examples in the image.

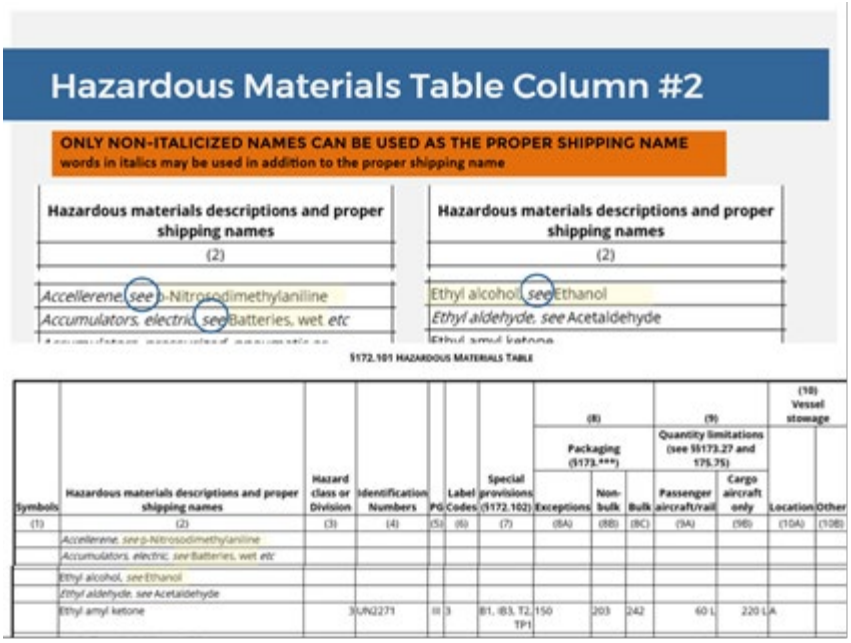
Proper shipping names may be used in the singular or plural and in either capital or lower case letters. Punctuation marks are not part of the proper shipping name but may be used.

First, let's review the examples of italicized words that are not part of the proper shipping names.

Italicized words convey additional information.

Please see the highlighted example in the image, *in alcohol*.



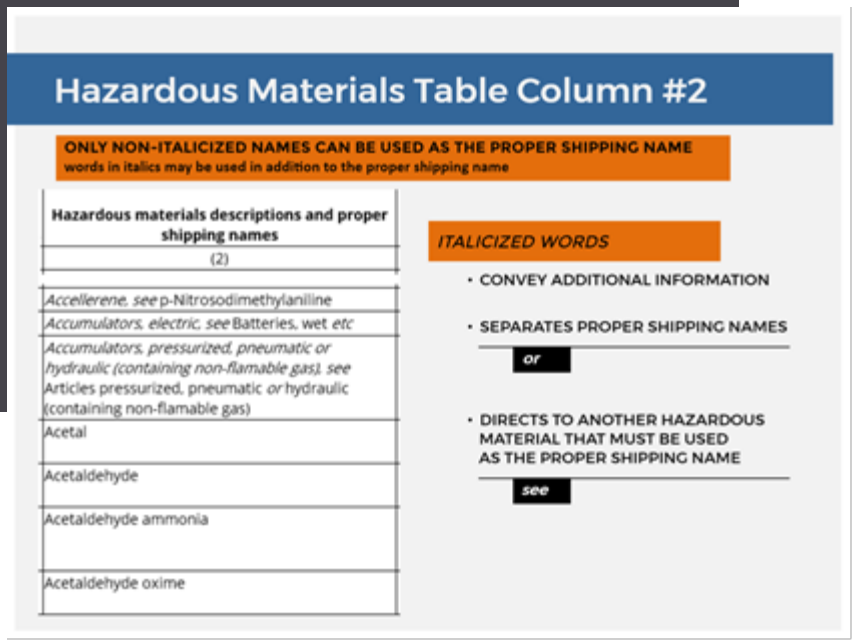


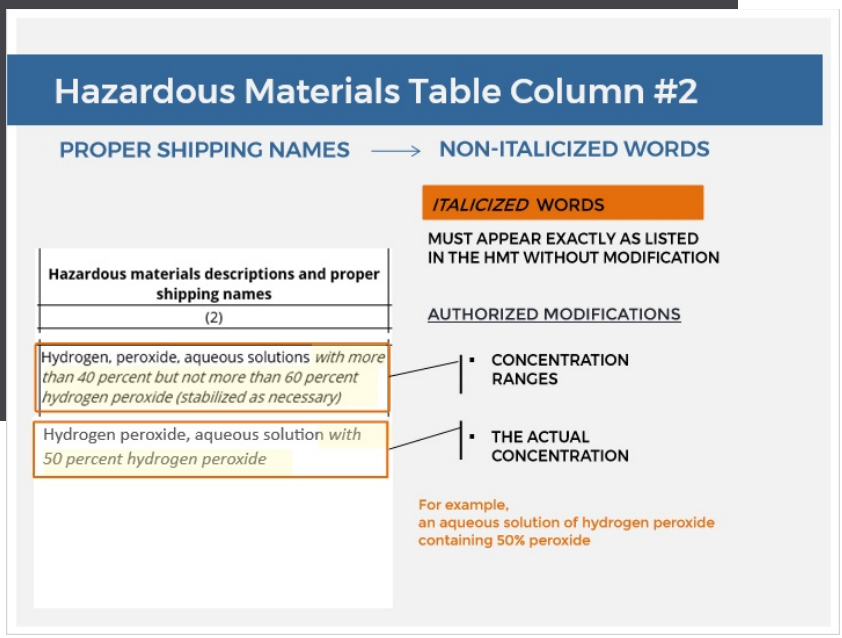
NARRATION:

The next example contains the italicized word "*OR*."

This word indicates that both shipping names are acceptable: acetic acid glacial "*or*" acetic acid solution because they are both written in non-italicized font. In other words, **italicized word** "*OR*" separates proper shipping name options.
In many cases, the italicized word "*see*" follows the italicized hazardous material, directing you to a different hazardous material that is written in non-italicized font.

Remember, only **non-italicized** names can be used as the proper shipping name; words in **italics** may be used in addition to the proper shipping name. In some instances, one entry references another entry and both names are not italicized. This means that either name can be used as the proper shipping name.
In the example, "Ethyl alcohol," you are directed to the entry for Ethanol. All the other columns are left blank because all information will be provided in the entry to which you were directed.

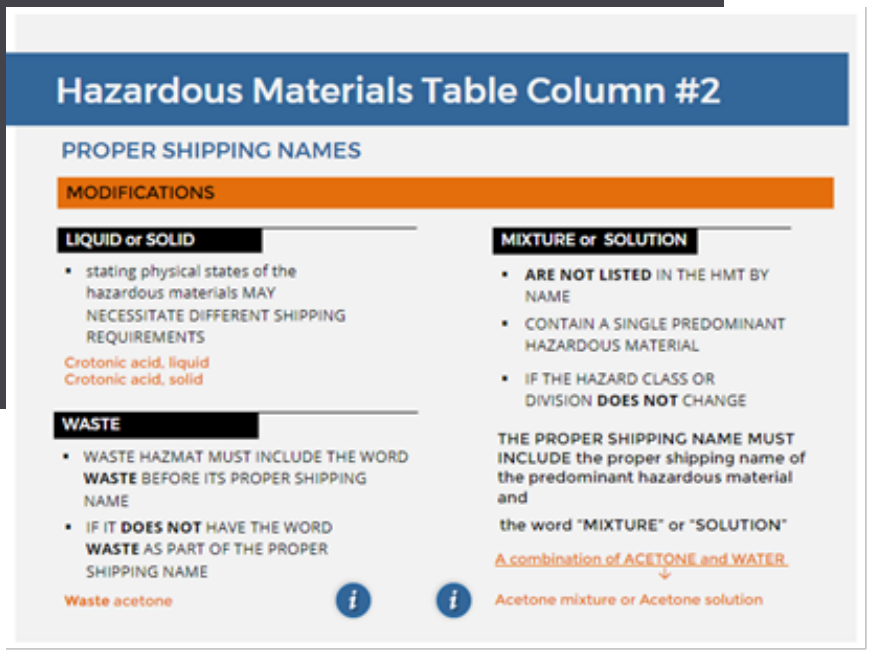




NARRATION:

In other words, italicized word "*see*" directs user to another hazardous material that must be used as the proper shipping name.

Only non-italicized words are part of the proper shipping name. Italicized words may be used in addition to the proper shipping name. When used, the **italicized text** must appear exactly as it is listed in the HMT without modification. Please see the highlighted examples in the image. However, for proper shipping names that include concentration ranges, some modification is authorized. If the actual concentration is within the range stated, the actual concentration may be used in place of the concentration range. For example, an aqueous solution of hydrogen peroxide containing 50 percent peroxide may be described the way it is displayed in the highlighted box, with the concentration range or stating the actual concentration "Hydrogen peroxide, aqueous solution with 50 percent hydrogen peroxide."



NARRATION:

Modifications to proper shipping names include the following:

- Liquid or solid:

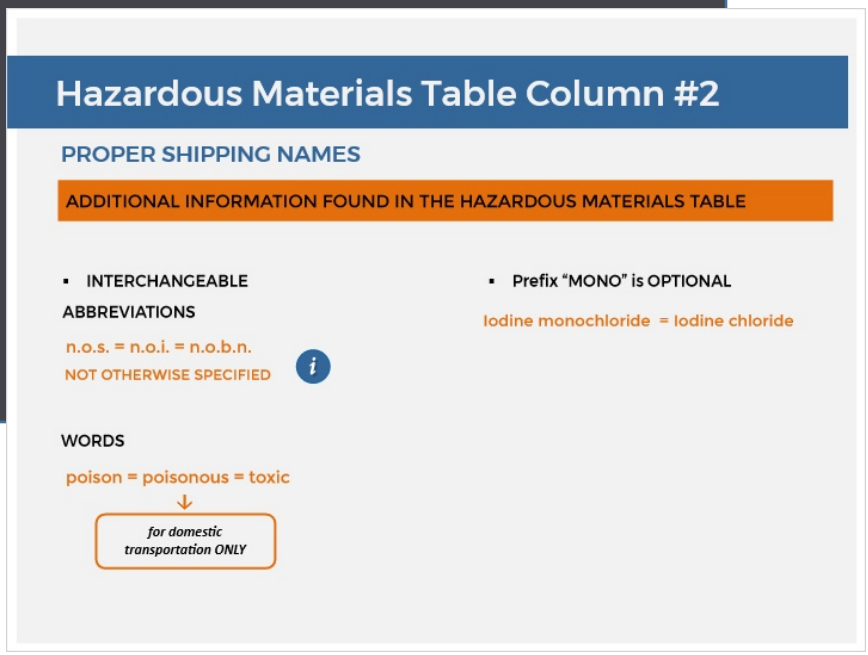
It may be necessary to indicate physical states of the hazardous materials if they can be shipped as a liquid or a solid because it may necessitate different shipping requirements.
For example, Crotonic acid, liquid and Crotonic acid, solid.

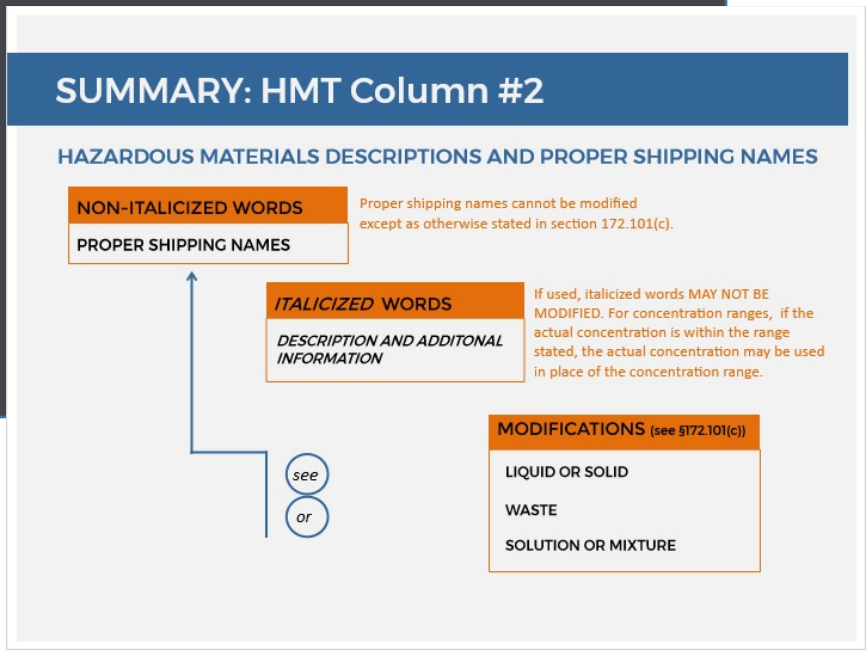
- Hazardous waste:

Waste hazardous material must include the word “waste” before its proper shipping name, if it does not have the word “waste” as part of the proper shipping name. For example, Waste acetone.

- Mixture or solution:

In situations when mixtures and solutions are not listed in the HMT by name, contain a single predominant hazardous material, and if the hazard class or division does not change, the proper shipping name must include the proper shipping name of the predominant hazardous material and the word “mixture" or "solution.” For example, if acetone is combined with water, the proper shipping name will be Acetone mixture or Acetone solution.





NARRATION:

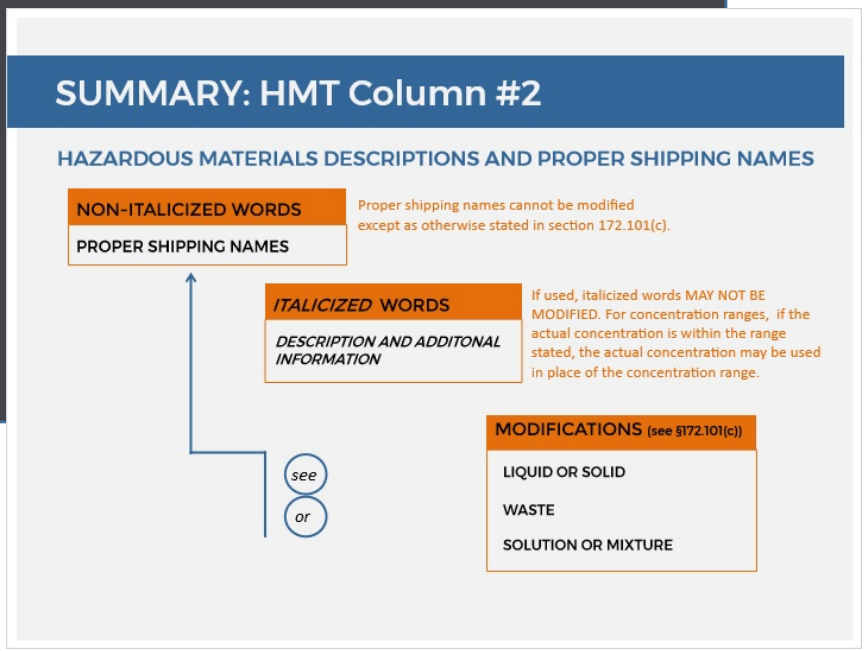
And a few **additional items** THAT may be found in the Hazardous Materials Table:
Interchangeable abbreviations- N.O.S., N.O.I., N.O.B.N.
These abbreviations all have the same meaning as not otherwise specified.
Interchangeable words- POISON, POISONOUS, TOXIC.
The words poison, poisonous, and toxic may be used interchangeably if the hazmat is shipped domestically.
The use of the prefix "mono" is optional. For example, either Iodine monocloride or Iodine chloride may be used.

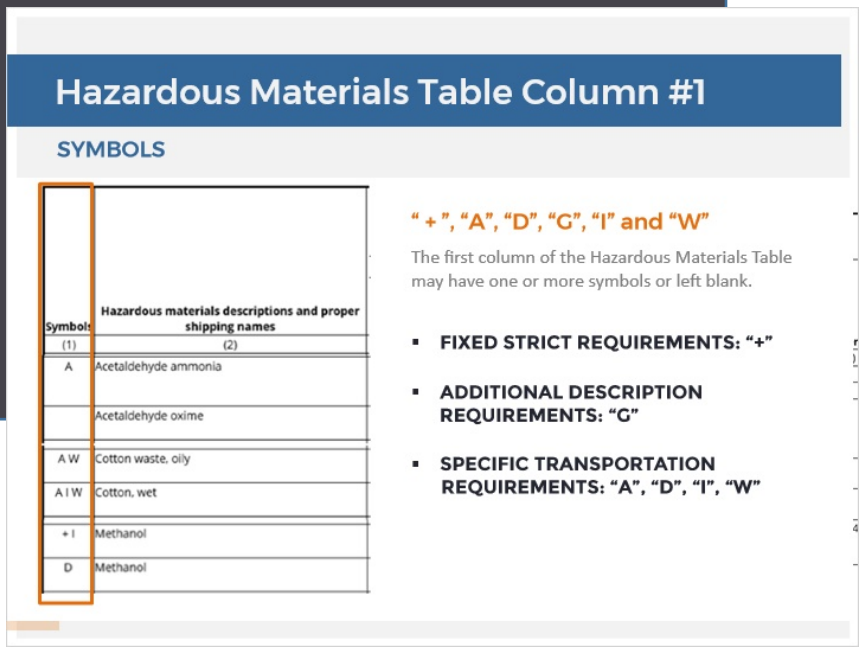
Let's review.

Column 2 includes hazardous materials descriptions and proper shipping names.

Non-italicized words are used as part of the proper shipping names. Proper shipping names cannot be **modified** except as otherwise stated in section 172.101(c).

Descriptions and additional information are in **italicized font**. If used, italicized words may not be modified.





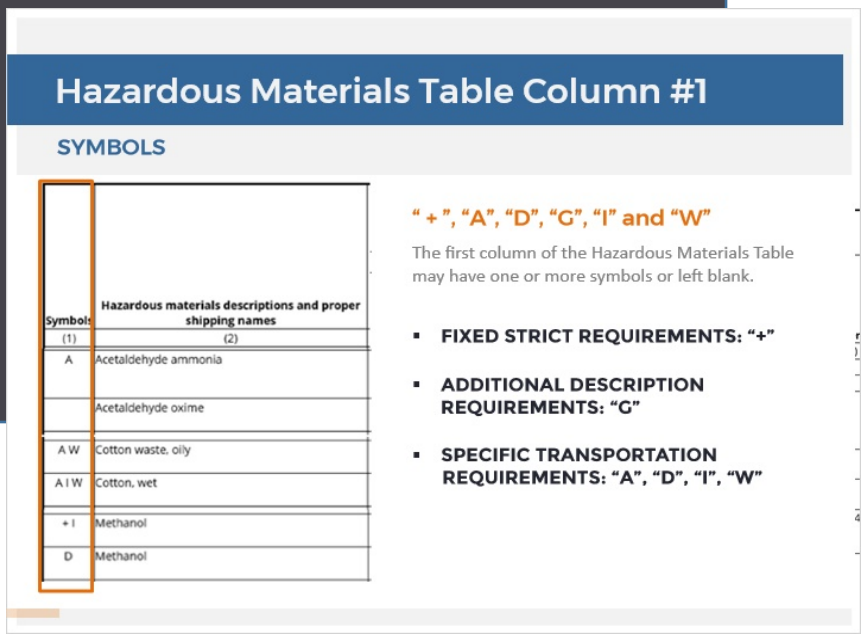
NARRATION:

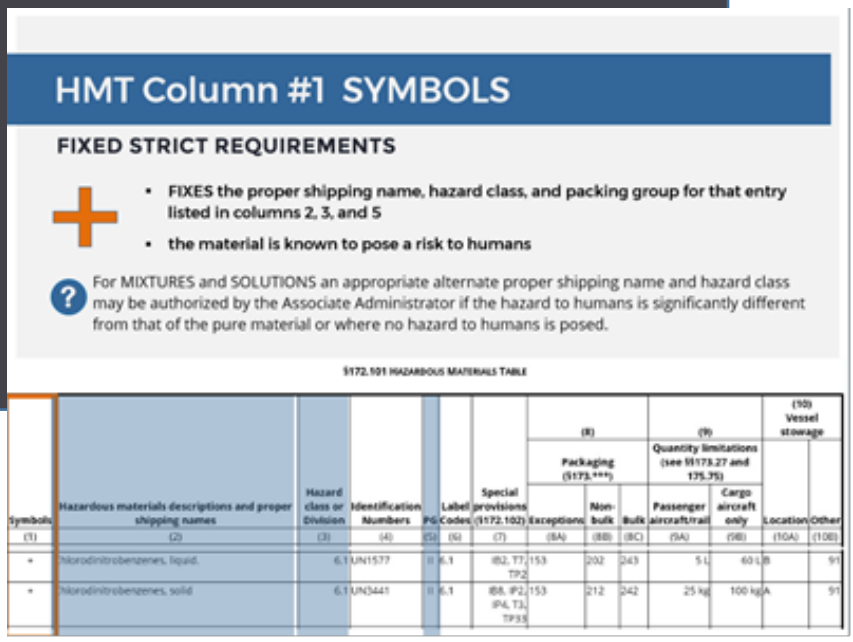
However, for **concentration ranges**, if the actual concentration is within the range stated, the actual concentration may be used in place of the concentration range.
Italicized words: "*see*" and "*or*" direct you to a different entry.
In some cases, **modifications** must be made to the proper shipping name, such as liquid or solid, waste, solution, or mixture.

Now, we will turn our attention to Column #1: "Symbols" of the Hazardous Materials Table.

The **first column** of the Hazardous Materials Table can be left blank or may have one or more **symbols**:

"+ ," "A," "D," "G," "I," and "W"



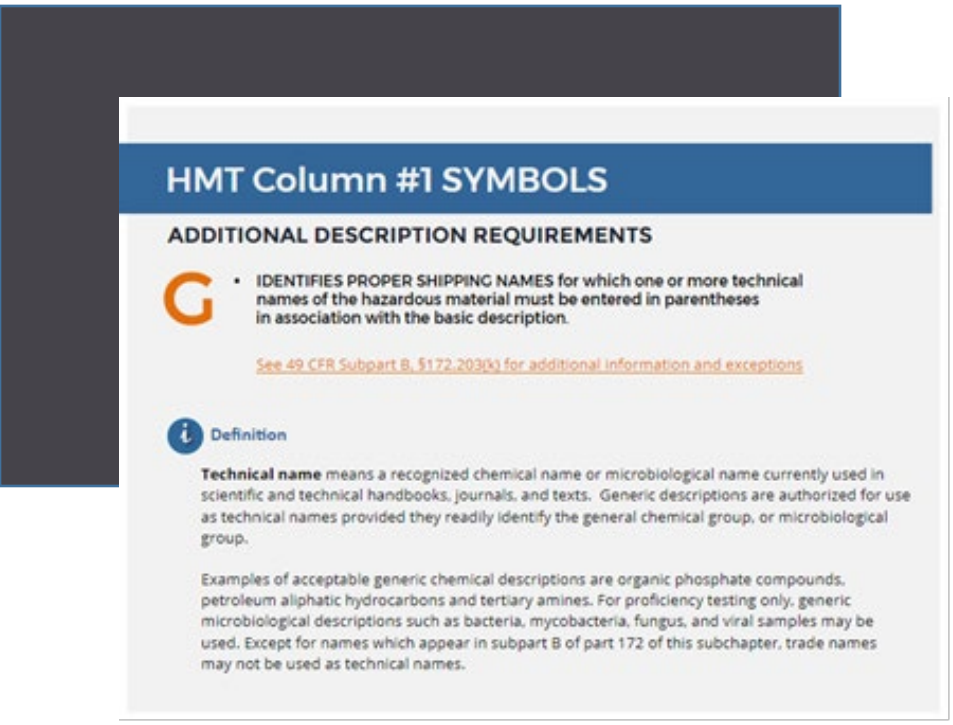


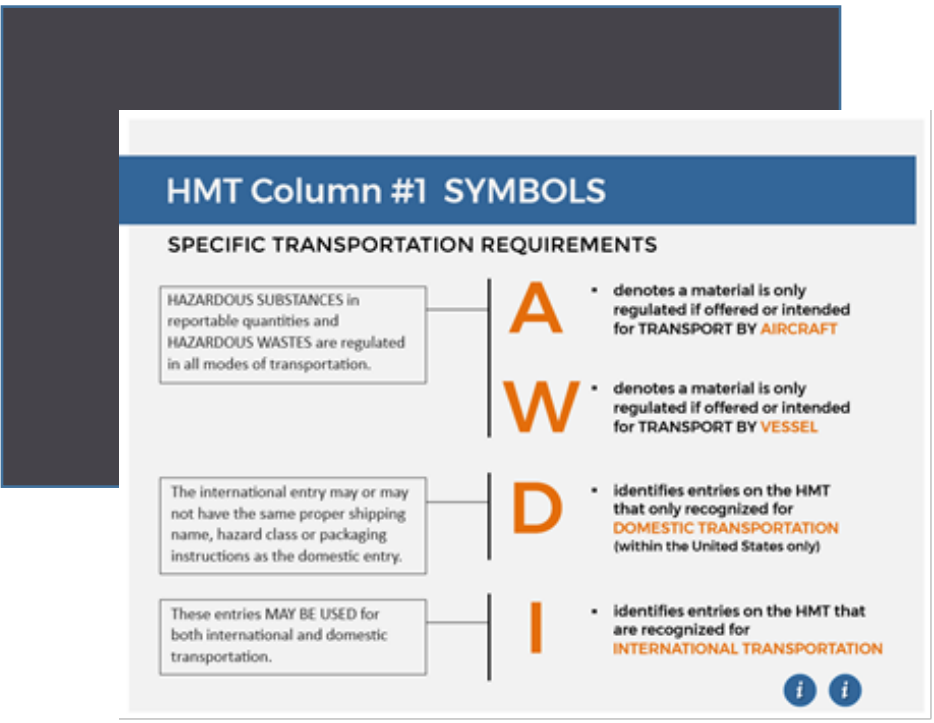
NARRATION:

The **plus sign** indicates fixed strict requirements.
Letter **"G"** in the first column of the Hazardous Materials Table indicates that additional description is required based on §172.203 (k).
Letters "A," "D," "I," and "W" in the first column of the Hazardous Materials Table indicate specific transportation requirements.

The **plus sign** fixes the proper shipping name, hazard class, and packing group for that entry. Listed in columns 2, 3, and 5. Also, the plus sign means that the material is known to pose a risk to humans.

Please note that for Mixtures and Solutions, an appropriate alternate proper shipping name and hazard class may be authorized by the Associate Administrator if the hazard to humans is significantly different from that of the pure material or where no hazard to humans is posed.





NARRATION:

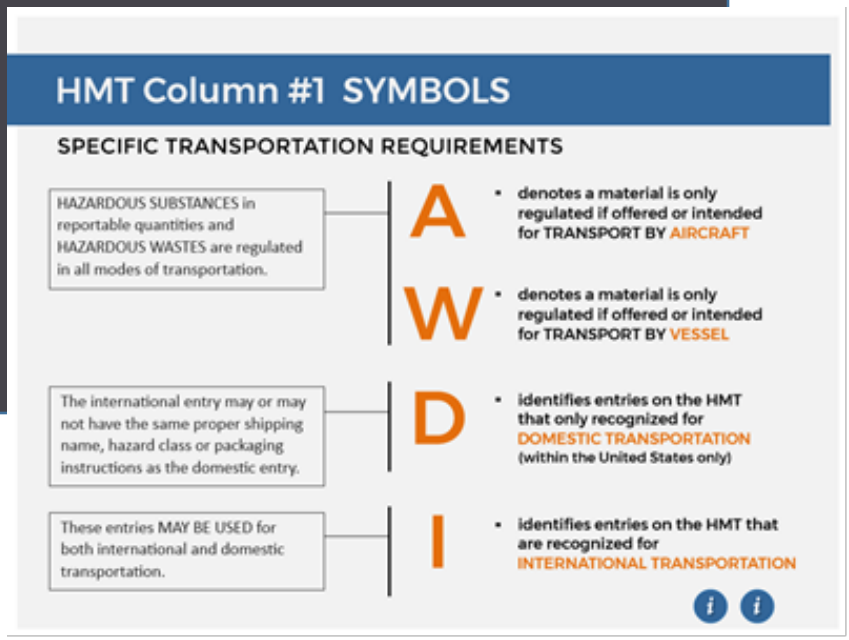
The **letter "G"** identifies proper shipping names for which one or more technical names of the hazardous material must be entered in parentheses, in association with the basic description. (See §172.203(k).) The definition for "Technical name" in §171.8 is shown in the image.

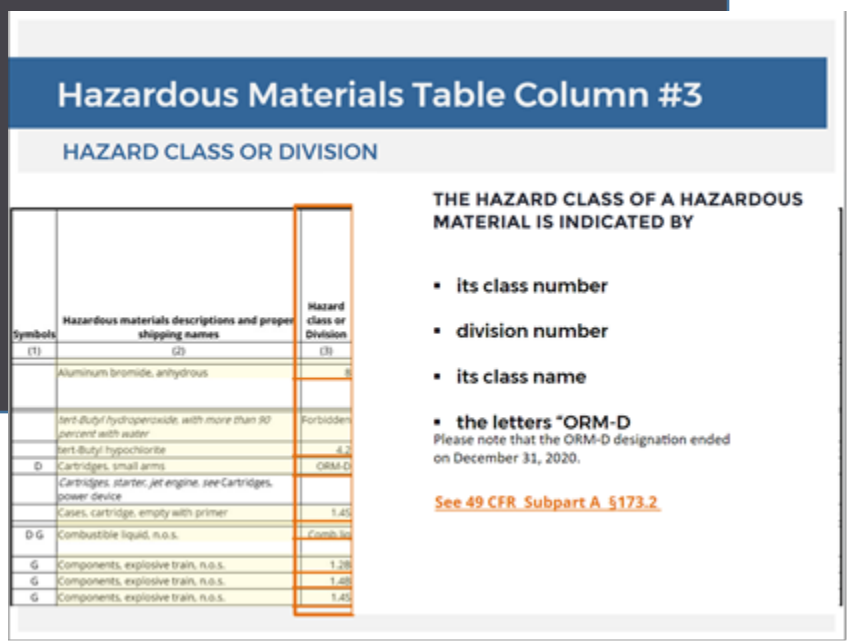
Specific transportation requirements are identified by the letters "A," "W," "D," "I," in the first column of the hazardous materials table.

The **letter "A"** denotes material that is only regulated if offered or intended for transport by aircraft.

The **letter "W"** denotes material that is only regulated if offered or intended for transport by vessel. Unless the material is a hazardous substance or a hazardous waste. **Hazardous substances** in reportable quantities and hazardous wastes are regulated in all modes of transportation.

The **letter "D"** identifies entries on the HMT that are only recognized for domestic transportation.





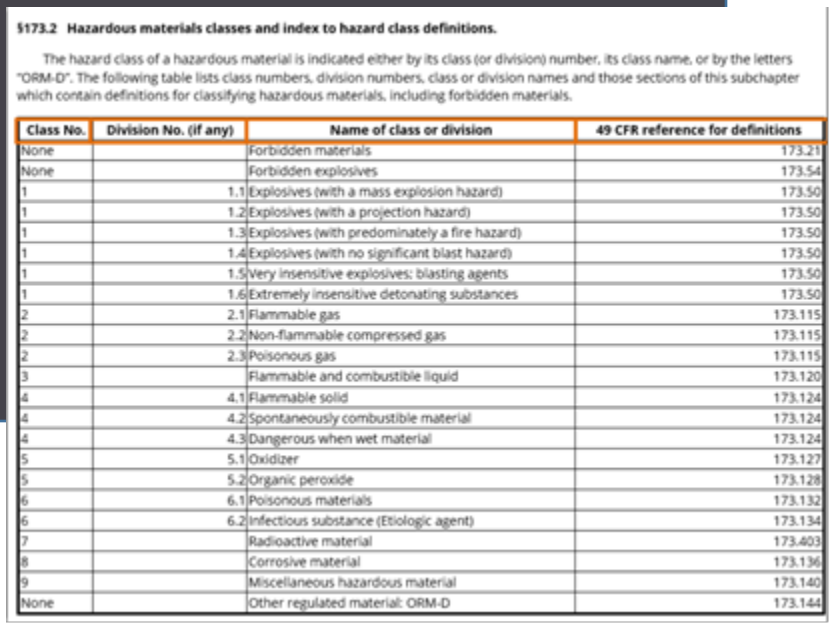
NARRATION:

The **international entry** may or may not have the same proper shipping name, hazard class or packaging instructions as the domestic entry.

The **letter "I"** identifies entries on the HMT which are recognized for international transportation.
These entries **may be used** for both international and domestic transportation.

Column #3 of the Hazardous Materials Table is labeled Hazard Class or Division and contains the designation of the hazard class or division corresponding to each proper shipping name. In some cases, it contains the word "Forbidden."

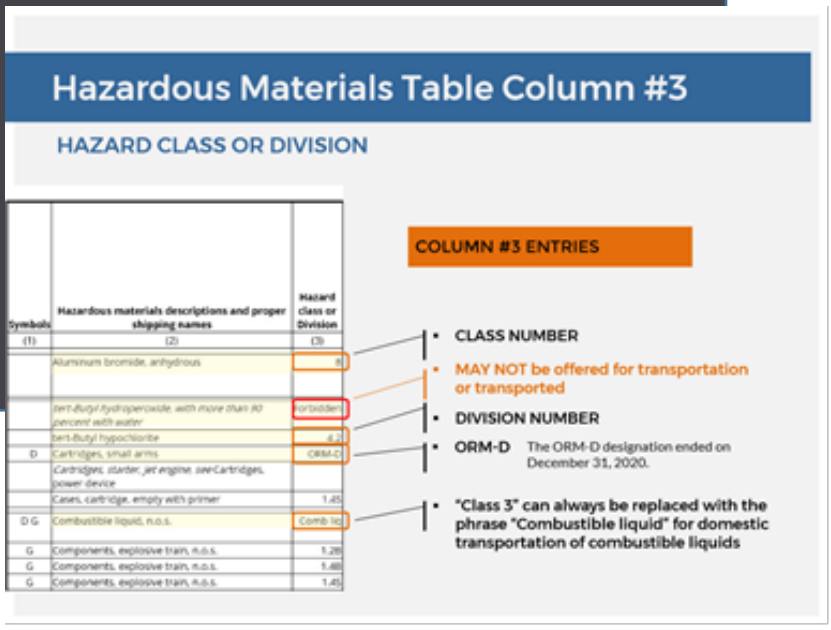
The **hazard class** of a hazardous material is indicated either by its class number, its division number, its class name or the letters "ORM-D." This information can be located in section 173.2 of the Hazardous Materials Regulations.



§173.2 Hazardous materials classes and index to hazard class definitions.

The hazard class of a hazardous material is indicated either by its class (or division) number, its class name, or by the letters "ORM-D". The following table lists class numbers, division numbers, class or division names and those sections of this subchapter which contain definitions for classifying hazardous materials, including forbidden materials.

Class No.	Division No. (if any)	Name of class or division	49 CFR reference for definitions
None		Forbidden materials	173.21
None		Forbidden explosives	173.54
1	1.1	Explosives (with a mass explosion hazard)	173.50
1	1.2	Explosives (with a projection hazard)	173.50
1	1.3	Explosives (with predominately a fire hazard)	173.50
1	1.4	Explosives (with no significant blast hazard)	173.50
1	1.5	Very insensitive explosives; blasting agents	173.50
1	1.6	Extremely insensitive detonating substances	173.50
2	2.1	Flammable gas	173.115
2	2.2	Non-flammable compressed gas	173.115
2	2.3	Poisonous gas	173.115
3		Flammable and combustible liquid	173.120
4	4.1	Flammable solid	173.124
4	4.2	Spontaneously combustible material	173.124
4	4.3	Dangerous when wet material	173.124
5	5.1	Oxidizer	173.127
5	5.2	Organic peroxide	173.128
6	6.1	Poisonous materials	173.132
6	6.2	Infectious substance (Etiologic agent)	173.134
7		Radioactive material	173.403
8		Corrosive material	173.136
9		Miscellaneous hazardous material	173.140
None		Other regulated material: ORM-D	173.144



NARRATION:

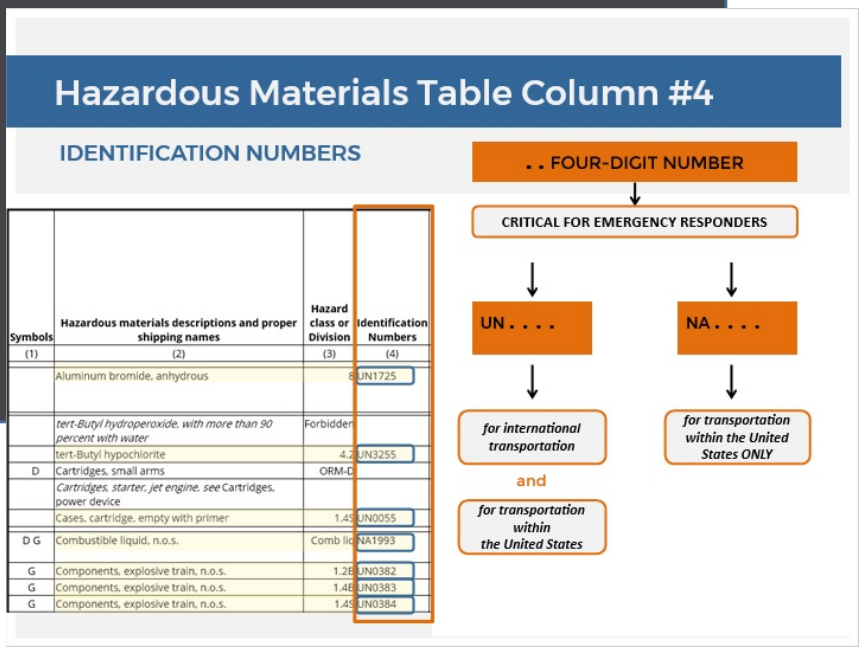
Let's take a look.
This **table** lists class numbers, division numbers, and class or division names.
In addition, it lists those sections of the subchapter that contain definitions for classifying hazardous materials, including forbidden materials.
This information will be covered in more detail in the "Placarding" and "Labeling" section of this training module.

Let's review a **few examples** from the Hazardous Materials Table.

- Aluminum bromide, anhydrous: hazardous class 8
- tert-Butyl hypochloride: Hazard Division 4.2.
- Cartridges, small arms: Hazard class or division - ORM-D

Please note that the ORM-D designation ended on December 31, 2020.

Combustible liquid, n.o.s. "Class 3" in Column 3 of HMT can always be replaced with the phrase, "Combustible Liquid," for domestic transportation of combustible liquids. A material for which the entry in this column is "Forbidden" may not be offered for transportation or transported.



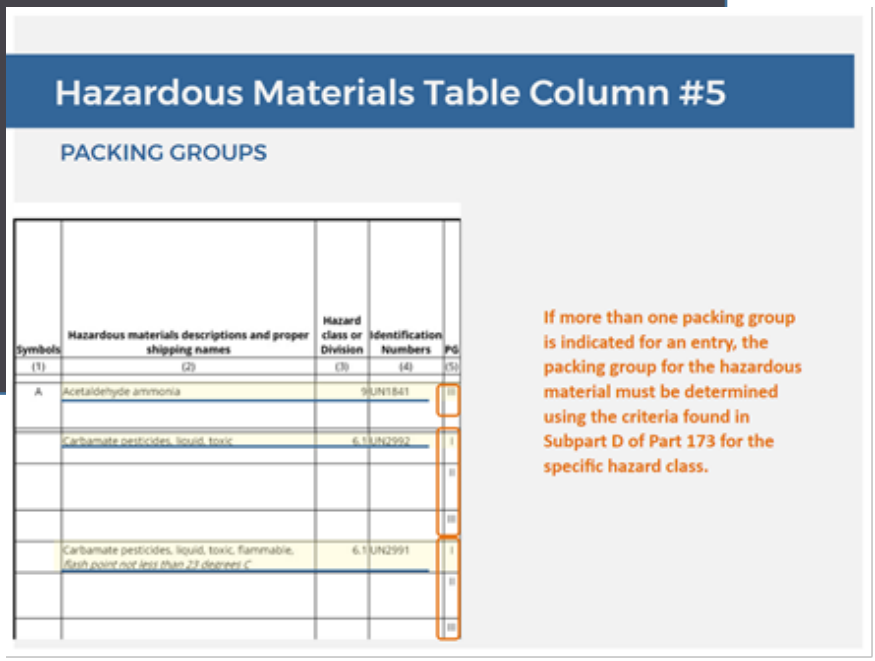
NARRATION:

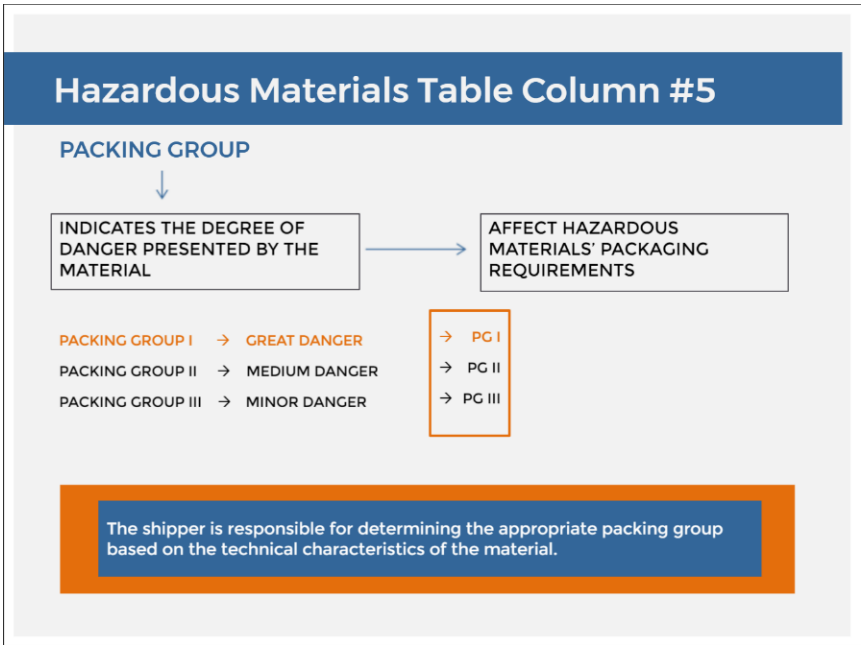
Column four of the Hazardous Materials Table lists the identification number assigned to each proper shipping name. These **4-digit numbers** provide quick identification of all hazardous materials.

It is critical to emergency responders that the numbers are accurate and that they are legibly displayed.

Identification numbers that start with the letters, **"UN,"** are associated with proper shipping names considered appropriate for both, international and domestic transportation.

Identification numbers that start with the letters, **"NA,"** are associated with proper shipping names considered appropriate for domestic transportation only.





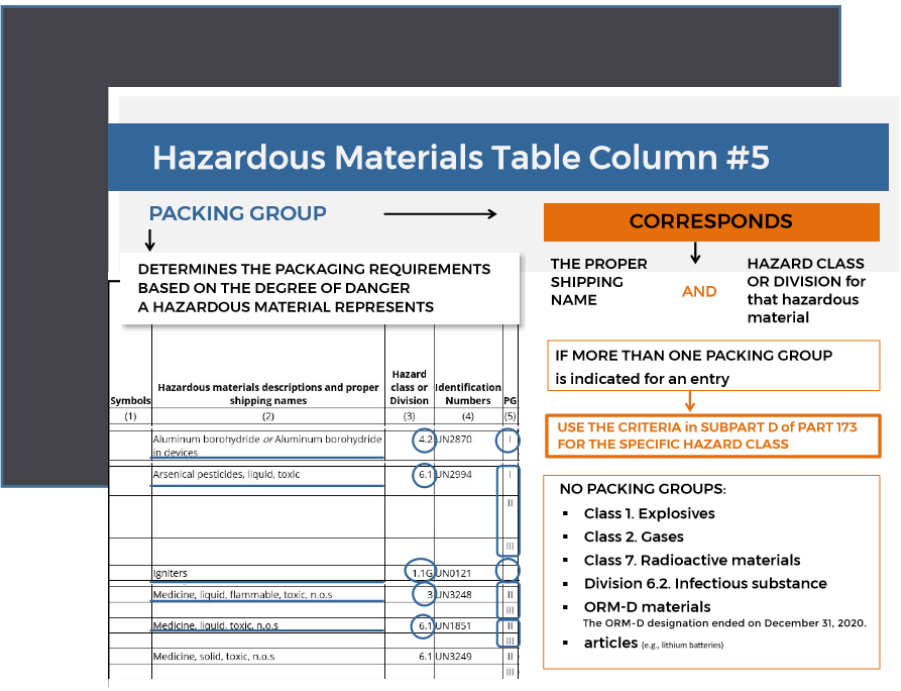
NARRATION:

Column 5 is labeled Packing Group. It specifies one or more **packing groups** assigned to a material corresponding to the proper shipping name and hazard class for that hazardous material. If more than one packing group is indicated for an entry, the packing group for the hazardous material must be determined using the criteria found in Subpart D of Part 173 for the specific hazard class.

Packing groups indicate the degree of danger presented by the materials and determine materials' packaging requirements.

- Packing Group one = Great Danger
- Packing Group two = Medium Danger
- Packing Group three = Minor Danger

On **shipping papers**, the packing group number must be indicated in Roman numerals preceded by the letters "PG," when applicable, as illustrated in the image. Packing groups are not assigned to all classes of materials. The shipper is responsible for determining the appropriate packing group based on the technical characteristics of the material.



NARRATION:

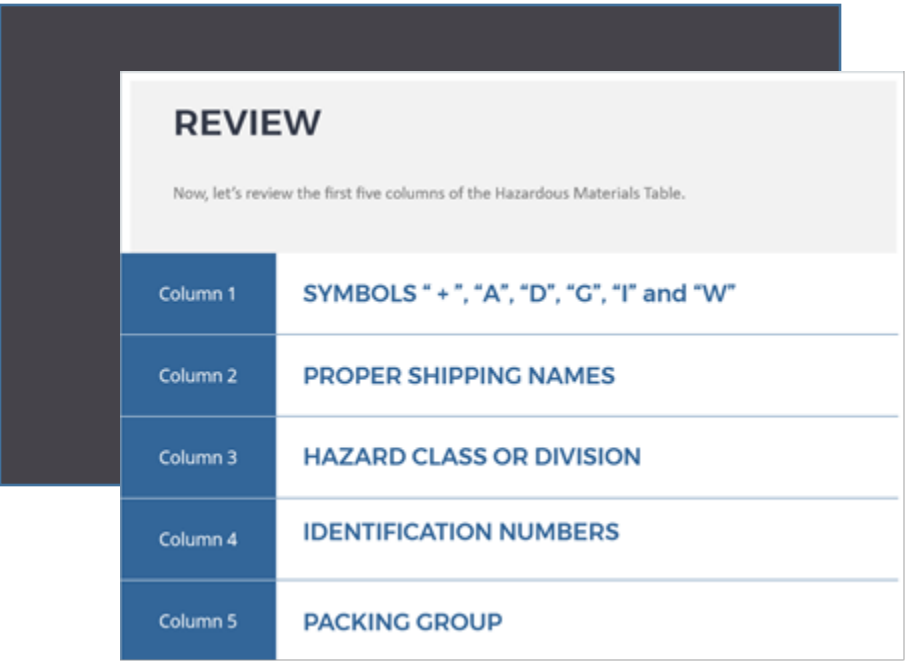
Remember that the packing group always corresponds to the proper shipping name and hazard class for that hazardous material. Let's look at a few examples.

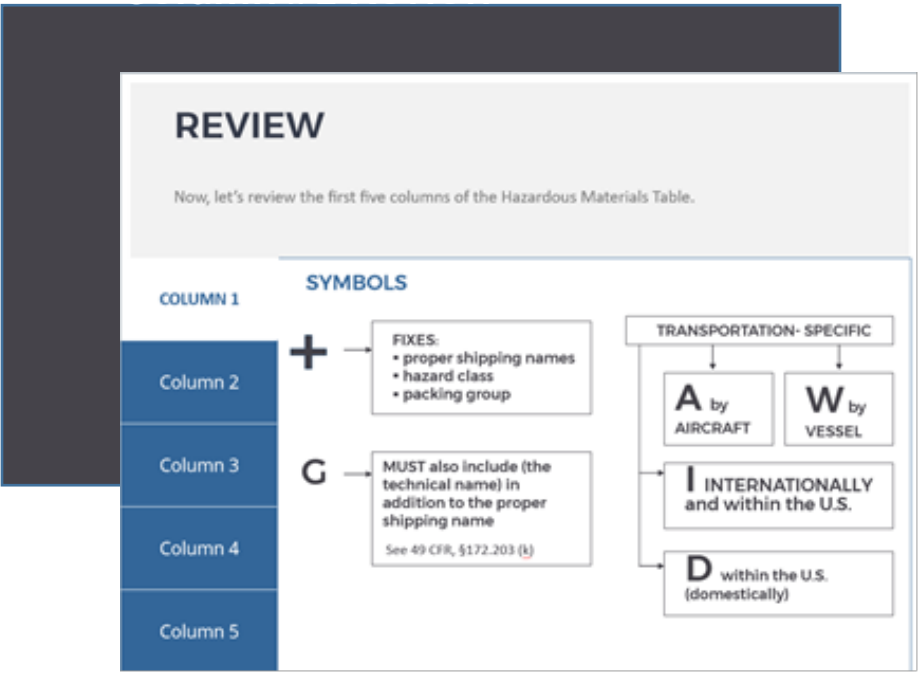
- Aluminum borohydryde or Aluminum borohydride in devices Hazard Division 4.2, Packing Group 1
- Arsenical pesticides, liquid, toxic Hazardous Division 6.1, and three Packing Groups were assigned to this hazmat
- Igniters, Hazard division 1.1G and no packing group was assigned
- Medicine, liquid, flammable, toxic, n.o.s. Hazard Class 3, Packing Group 2 and 3
- Medicine liquid, toxic, n.o.s. Hazard division 6.1 and the packing group 2 and 3

If more than one packing group is indicated for an entry, the packing group for the hazardous material must be determined using the criteria found in Subpart D of Part 173 for the specific hazard class.
Also, there are no packing groups designated for the materials in these groups:

- Class 1. Explosives
- Class 2. Gases
- Class 7. Radioactive materials
- Division 6.2. Infectious substance
- ORM-D materials (The ORM-D designation ended on December 31, 2020.)
- and articles

It is important to remember that the packing group determines the packaging requirements based on the degree of danger a hazardous material represents.

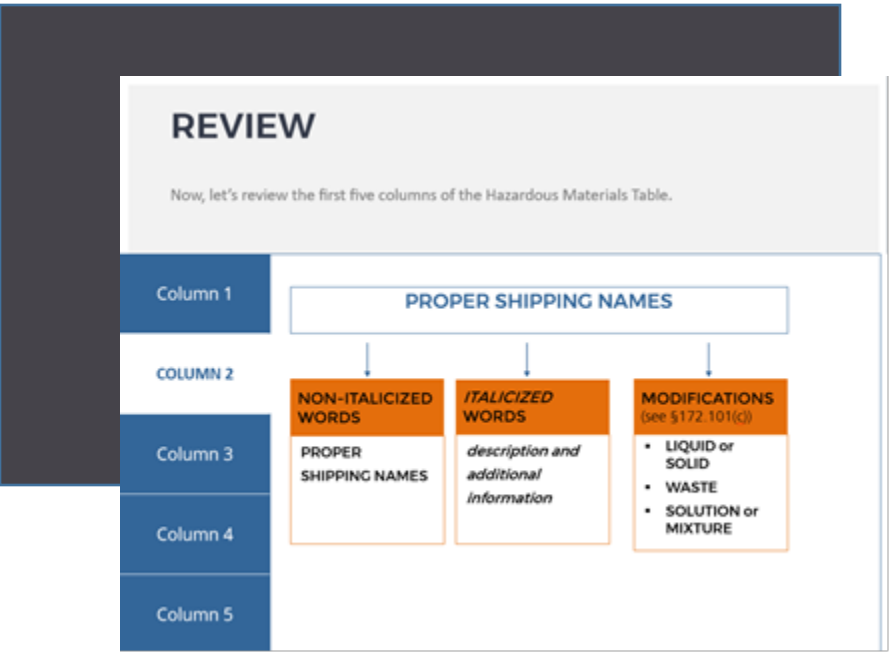




NARRATION:

Now, let's **review** the first five columns of the Hazardous Materials Table.

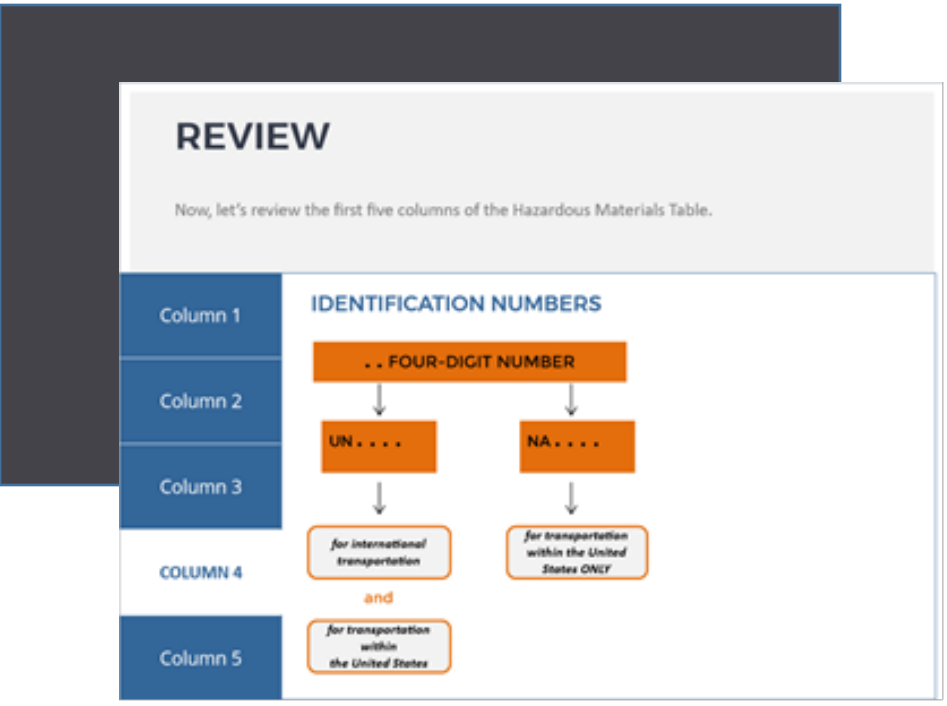
Column #1:
The first column of the Hazardous Materials Table can be left blank or may have one or more symbols.
The **plus sign** indicates fixed strict requirements.
Letter **"G"** indicates that additional description is required based on the §172.203 (k).
And "A," "W," "I," and "D" **symbols** designate groups of hazardous materials with specific transportation requirements.

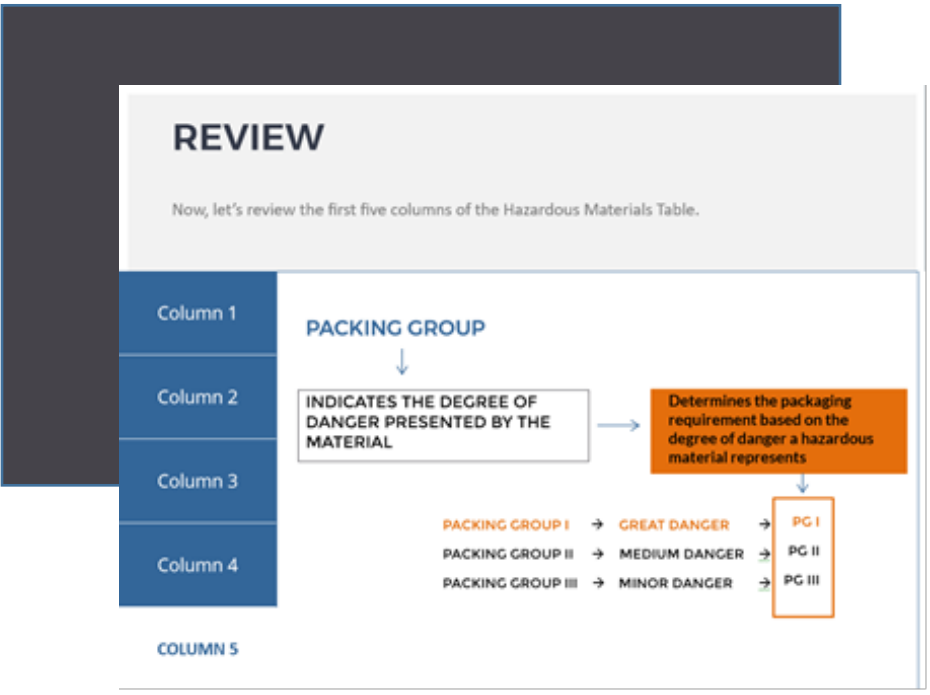


NARRATION:

Column #2:
Column #2 includes proper shipping names.
Non-italicized words are used as part of the proper shipping names.
Descriptions and additional information are in **italicized** font.
In some cases, **conditional information** must be added to the proper shipping name, such as liquid or solid, waste, solution, and mixture.

Column #3:
Column #3 of the Hazardous Materials Table is labeled Hazard Class or Division and contains a designation of the hazard class or division corresponding to each proper shipping name.
In some cases, it contains the word "Forbidden."

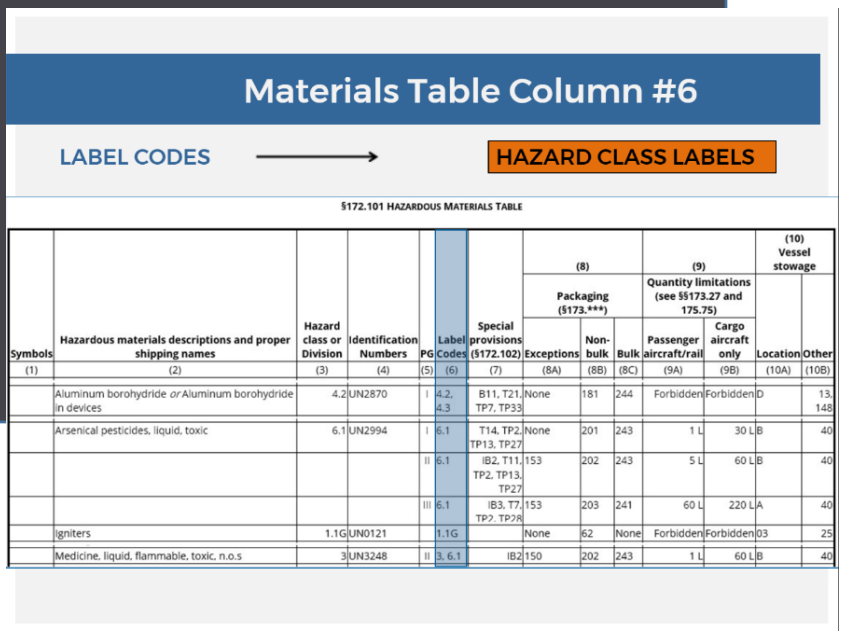




NARRATION:

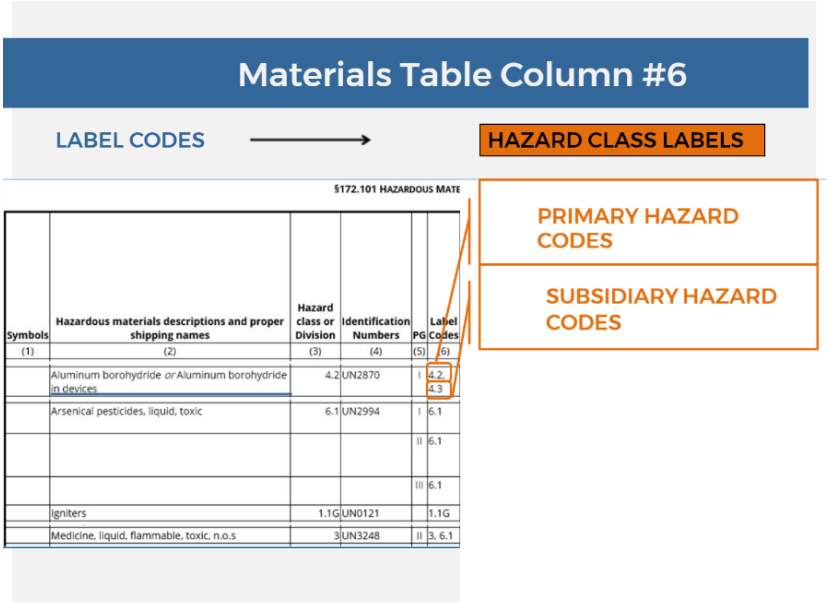
Column #4:
Identification numbers are generally preceded by the letters **"UN,"** for United Nations, and identify HMT entries for domestic and/or international shipments. Some identification numbers are preceded by the letters **"NA,"** for North America, may only be used when transported within the United States.

Column #5:
Column #5 of the HMT specifies one or more packing groups assigned to a material corresponding to the proper shipping name and hazard class for that hazardous material.
Packing groups indicate the degree of danger presented by the material.
Packing group one is assigned to hazardous materials that represent great danger.



§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Aluminum borohydride *or* Aluminum borohydride in devices	4.2	UN2870	I	4.2, 4.3	B11, T21, TP7, TP33	None	181	244	Forbidden	Forbidden	D	13, 148
	Arsenical pesticides, liquid, toxic	6.1	UN2994	I	6.1	T14, TP2, TP13, TP27	None	201	243	1 L	30 L	B	40
				II	6.1	IB2, T11, TP2, TP13, TP27	153	202	243	5 L	60 L	B	40
				III	6.1	IB3, T7, TP2, TP28	153	203	241	60 L	220 L	A	40
	Igniters	1.1G	UN0121		1.1G		None	62	None	Forbidden	Forbidden	03	25
	Medicine, liquid, flammable, toxic, n.o.s	3	UN3248	II	3, 6.1	IB2	150	202	243	1 L	60 L	B	40



§172.101 HAZARDOUS MATE

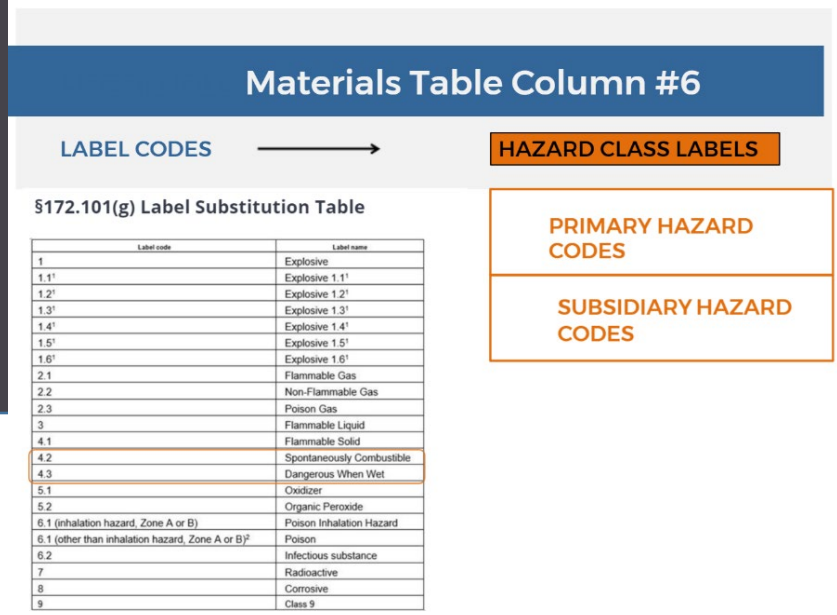
Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes
(1)	(2)	(3)	(4)	(5)	(6)
	Aluminum borohydride *or* Aluminum borohydride in devices	4.2	UN2870	I	4.2, 4.3
	Arsenical pesticides, liquid, toxic	6.1	UN2994	I	6.1
				II	6.1
				III	6.1
	Igniters	1.1G	UN0121		1.1G
	Medicine, liquid, flammable, toxic, n.o.s	3	UN3248	II	3, 6.1

NARRATION:

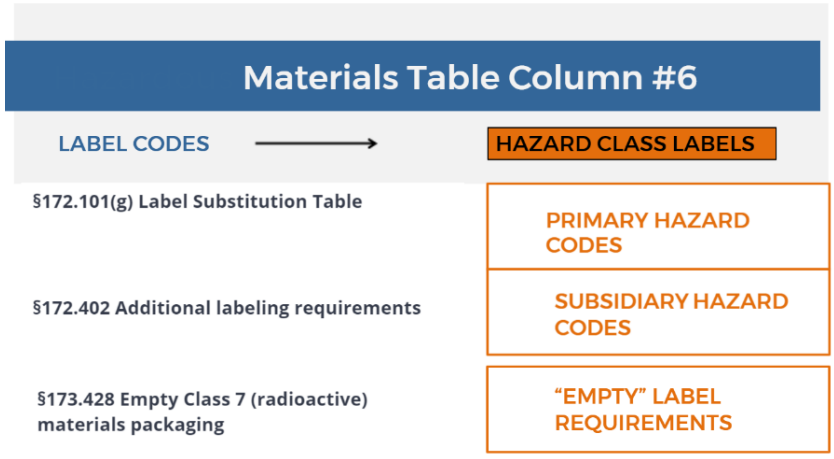
Column #6 'Label Codes' of the Hazardous Materials Table specifies the **hazard class labels** that must be applied to each package that contains associated hazardous material.

For example:
Aluminum borohydryde or Aluminum borohydride in devices.

Label Codes 4.2 and 4.3 are listed.
The first code, 4.2, represents the **primary hazard** of the material.
Additional label codes represent subsidiary hazards.



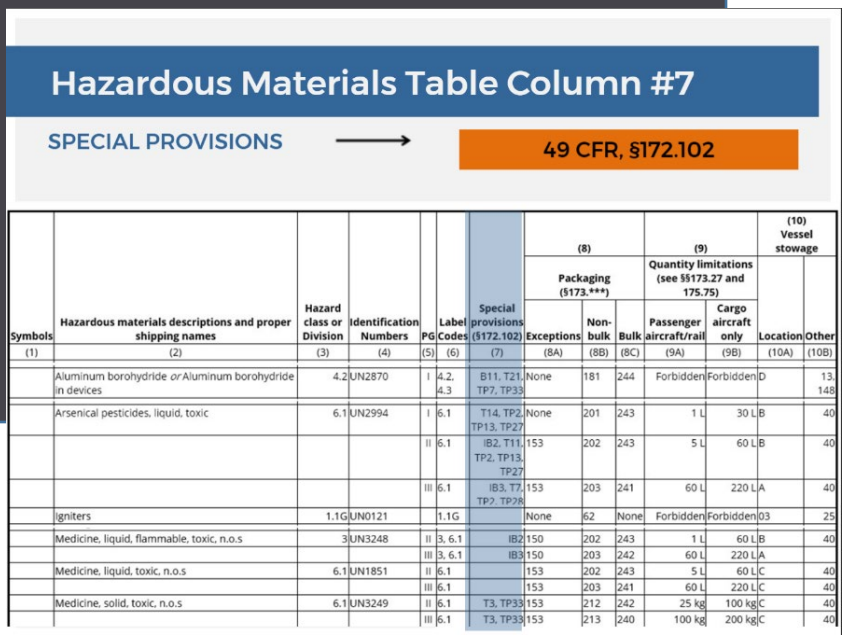
Label code	Label name
1	Explosive
1.1[1]	Explosive 1.1[1]
1.2[1]	Explosive 1.2[1]
1.3[1]	Explosive 1.3[1]
1.4[1]	Explosive 1.4[1]
1.5[1]	Explosive 1.5[1]
1.6[1]	Explosive 1.6[1]
2.1	Flammable Gas
2.2	Non-Flammable Gas
2.3	Poison Gas
3	Flammable Liquid
4.1	Flammable Solid
4.2	Spontaneously Combustible
4.3	Dangerous When Wet
5.1	Oxidizer
5.2	Organic Peroxide
6.1 (inhalation hazard, Zone A or B)	Poison Inhalation Hazard
6.1 (other than inhalation hazard, Zone A or B)[2]	Poison
6.2	Infectious substance
7	Radioactive
8	Corrosive
9	Class 9



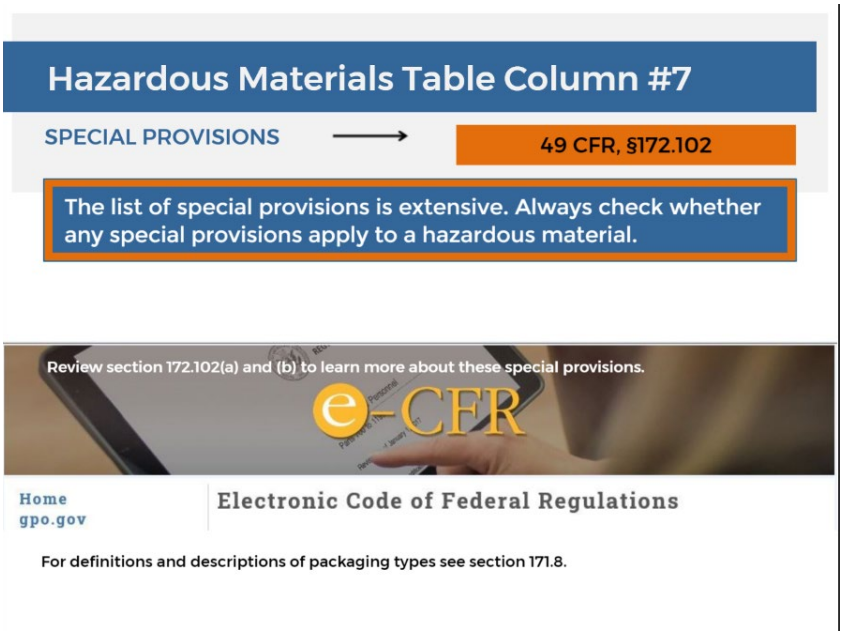
NARRATION:

4.3 indicates the **subsidiary hazard**.
The codes contained in Column 6 are defined in the table found in section 172.101(g).
In our example, 4.2 identifies that the label must be the "Spontaneously Combustible" label.
4.3 identifies that the label must be the "Dangerous When Wet" label.

Additional labeling requirements and exceptions are specified in section 172.402.
For **"Empty"** label requirements, see §173.428 of the Hazardous Materials Regulations.
Labeling will be covered in more depth in the "Labeling" section of this training.



Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Aluminum borohydride *or* Aluminum borohydride in devices	4.2	UN2870	I	4.2, 4.3	B11, T21, TP7, TP33	None	181	244	Forbidden	Forbidden	D	13, 148
	Arsenical pesticides, liquid, toxic	6.1	UN2994	I	6.1	T14, TP2, TP13, TP27	None	201	243	1 L	30 L	B	40
				II	6.1	IB2, T11, TP2, TP13, TP27	153	202	243	5 L	60 L	B	40
				III	6.1	IB3, T7, TP2, TP28	153	203	241	60 L	220 L	A	40
	Igniters	1.1G	UN0121		1.1G		None	62	None	Forbidden	Forbidden	03	25
	Medicine, liquid, flammable, toxic, n.o.s	3	UN3248	II	3, 6.1	IB2	150	202	243	1 L	60 L	B	40
				III	3, 6.1	IB3	150	203	242	60 L	220 L	A	
	Medicine, liquid, toxic, n.o.s	6.1	UN1851	II	6.1		153	202	243	5 L	60 L	C	40
				III	6.1		153	203	241	60 L	220 L	C	40
	Medicine, solid, toxic, n.o.s	6.1	UN3249	II	6.1	T3, TP33	153	212	242	25 kg	100 kg	C	40
				III	6.1	T3, TP33	153	213	240	100 kg	200 kg	C	40

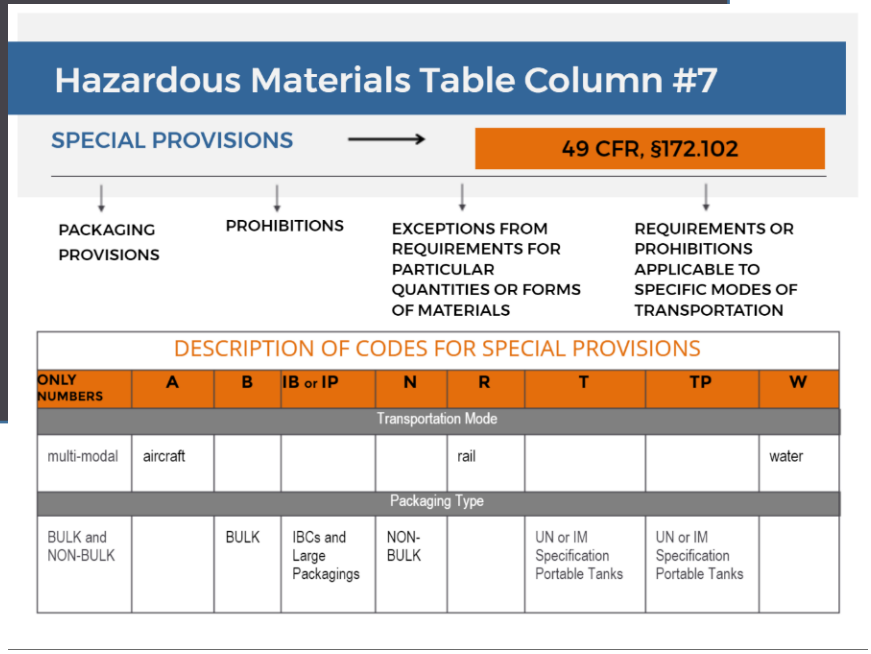


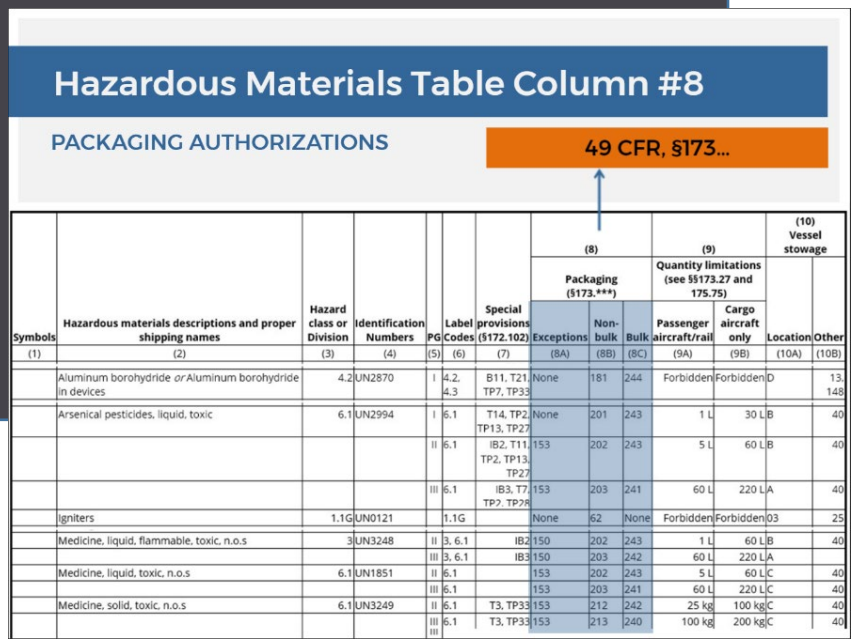
NARRATION:

Column 7 is labeled Special provisions.
It specifies codes for **special provisions** applicable to hazardous materials in addition to the standard requirements.
The meaning and requirements of special provisions are as set forth in section 172.102.
The list of special provisions is extensive.

Always check whether any special provisions apply to a hazardous material.

Review section 172.102(a) and (b) to learn more about these special provisions.
For definitions and descriptions of packaging types see section 171.8.





NARRATION:

Special provisions contain packaging provisions, prohibitions, and exceptions from requirements for particular quantities or forms of materials and requirements or prohibitions applicable to specific modes of transportation.

Description of codes for special provisions is illustrated in the table in the image.

Column eight of the HMT specifies the applicable sections containing the **packaging requirements** for a hazardous material.

Columns 8A, 8B, and 8C specify the applicable sections in §173 for exceptions, non-bulk packaging requirements, and bulk packaging requirements.

Let's look at a few examples to see how these columns were established.

Hazardous Materials Table Column #8

PACKAGING AUTHORIZATIONS — **49 CFR, §173...**

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Aluminum borohydride *or* Aluminum borohydride in devices	4.2	UN2870	I	4.2, 4.3	B11, T21, TP7, TP33	None	181	244	Forbidden	Forbidden	D	13, 148
	Arsenical pesticides, liquid, toxic	6.1	UN2994	I	6.1	T14, TP2, TP13, TP27	None	201	243	1 L	30 L	B	40
				II	6.1	IB2, T11, TP2, TP13, TP27	153	202	243	5 L	60 L	B	40
				III	6.1	IB3, T7, TP2, TP28	153	203	241	60 L	220 L	A	40
	Igniters	1.1G	UN0121		1.1G		None	62	None	Forbidden	Forbidden	03	25
	Medicine, liquid, flammable, toxic, n.o.s	3	UN3248	II	3, 6.1	IB2	150	202	243	1 L	60 L	B	40
				III	3, 6.1	IB3	150	203	242	60 L	220 L	A	
	Medicine, liquid, toxic, n.o.s	6.1	UN1851	II	6.1		153	202	243	5 L	60 L	C	40
				III	6.1		153	203	241	60 L	220 L	C	40
	Medicine, solid, toxic, n.o.s	6.1	UN3249	II	6.1	T3, TP33	153	212	242	25 kg	100 kg	C	40
				III	6.1	T3, TP33	153	213	240	100 kg	200 kg	C	40

Hazardous Materials Table Column #8

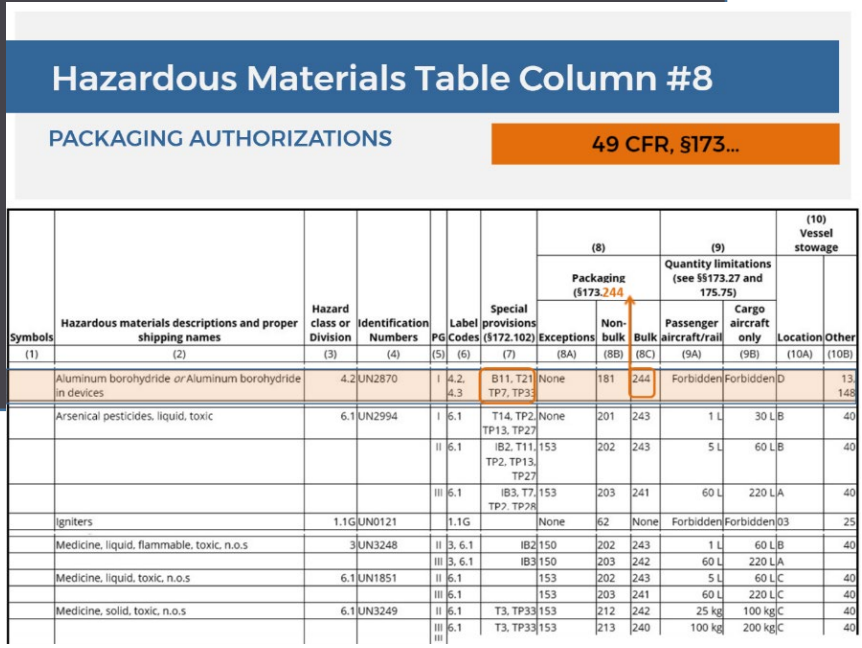
PACKAGING AUTHORIZATIONS — **49 CFR, §173...**

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.243 Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Aluminum borohydride *or* Aluminum borohydride in devices	4.2	UN2870	I	4.2, 4.3	B11, T21, TP7, TP33	None	181	244	Forbidden	Forbidden	D	13, 148
	Arsenical pesticides, liquid, toxic	6.1	UN2994	I	6.1	T14, TP2, TP13, TP27	None	201	243	1 L	30 L	B	40
				II	6.1	IB2, T11, TP2, TP13, TP27	153	202	243	5 L	60 L	B	40
				III	6.1	IB3, T7, TP2, TP28	153	203	241	60 L	220 L	A	40
	Igniters	1.1G	UN0121		1.1G		None	62	None	Forbidden	Forbidden	03	25
	Medicine, liquid, flammable, toxic, n.o.s	3	UN3248	II	3, 6.1	IB2	150	202	243	1 L	60 L	B	40
				III	3, 6.1	IB3	150	203	242	60 L	220 L	A	
	Medicine, liquid, toxic, n.o.s	6.1	UN1851	II	6.1		153	202	243	5 L	60 L	C	40
				III	6.1		153	203	241	60 L	220 L	C	40
	Medicine, solid, toxic, n.o.s	6.1	UN3249	II	6.1	T3, TP33	153	212	242	25 kg	100 kg	C	40
				III	6.1	T3, TP33	153	213	240	100 kg	200 kg	C	40

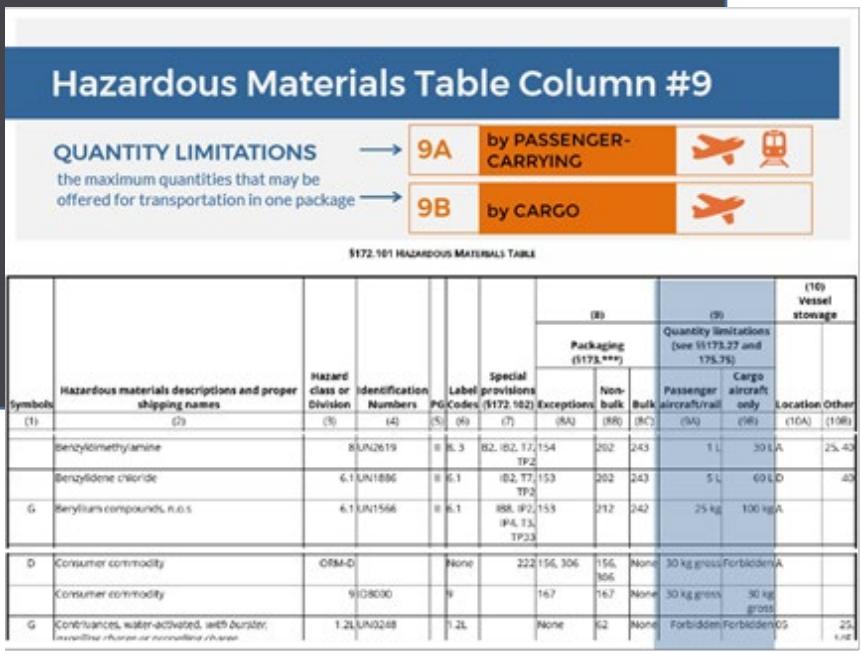
NARRATION:

Arsenical Pesticides, liquid, toxic. The entry "none" in **column 8A** indicates that no packaging exceptions are authorized, except as may be provided by special provisions in Column 7.
The meaning and requirements of special provisions are as set forth in section 172.102 of the Hazardous Materials Regulations.
The entry "201" in **column 8B** indicates that non-bulk packaging requirements prescribed in §173.201 are required for non-bulk packagings.

The entry "243" in **column 8C** indicates that bulk packaging requirements prescribed in §173.243 are required for bulk packagings. In other words, if you see a **three-digit number** written in columns 8A, 8B, or 8C, refer to the section that is associated with that number in part 173 of the Hazardous Materials Regulations. It will contain additional packaging requirements or exceptions.
For example, look for bulk requirements for the entry with the proper shipping name "Aluminum borohydryde or Aluminum borohydride in devices."



Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.244) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Aluminum borohydride *or* Aluminum borohydride in devices	4.2	UN2870	I	4.2, 4.3	B11, T21, TP7, TP33	None	181	244	Forbidden	Forbidden	D	13, 148
	Arsenical pesticides, liquid, toxic	6.1	UN2994	I	6.1	T14, TP2, TP13, TP27	None	201	243	1 L	30 L	B	40
				II	6.1	IB2, T11, TP2, TP13, TP27	153	202	243	5 L	60 L	B	40
				III	6.1	IB3, T7, TP2, TP28	153	203	241	60 L	220 L	A	40
	Igniters	1.1G	UN0121		1.1G		None	62	None	Forbidden	Forbidden	03	25
	Medicine, liquid, flammable, toxic, n.o.s	3	UN3248	II	3, 6.1	IB2	150	202	243	1 L	60 L	B	40
				III	3, 6.1	IB3	150	203	242	60 L	220 L	A	
	Medicine, liquid, toxic, n.o.s	6.1	UN1851	II	6.1		153	202	243	5 L	60 L	C	40
				III	6.1		153	203	241	60 L	220 L	C	40
	Medicine, solid, toxic, n.o.s	6.1	UN3249	II	6.1	T3, TP33	153	212	242	25 kg	100 kg	C	40
				III	6.1	T3, TP33	153	213	240	100 kg	200 kg	C	40



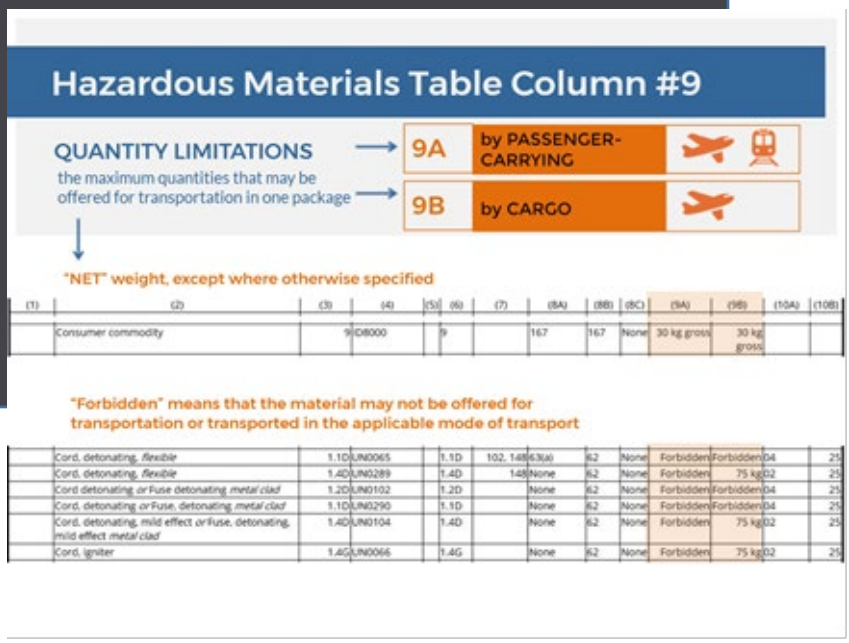
§172.101 Hazardous Materials Table

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Benzyldimethylamine	8	UN2619	II	8, 3	IB2, IB2, T7, TP2	154	202	243	1 L	30 L	A	25, 40
	Benzylidene chloride	6.1	UN1886	II	6.1	IB2, T7, TP2	153	202	243	5 L	60 L	D	40
G	Beryllium compounds, n.o.s.	6.1	UN1566	II	6.1	IB8, IP2, IP4, T3, TP33	153	212	242	25 kg	100 kg	A	
D	Consumer commodity	ORM-D			None	222	156, 306	156, 306	None	30 kg gross	Forbidden	A	
	Consumer commodity	9	ID8000	9			167	167	None	30 kg gross	30 kg gross		
G	Contrivances, water-activated, with burster, expelling charge or propelling charge	1.2L	UN0248		1.2L		None	62	None	Forbidden	Forbidden	09	25, 148

NARRATION:

Bulk packaging requirements are located in §173.244 part of the Hazardous Materials Regulations, but don't forget to also look at special provisions in column 7 applicable to bulk packagings.

Column 9 of the Hazardous Materials Table is labeled "Quantity limitations."
It is divided into two parts: Columns **9A** and **9B**.



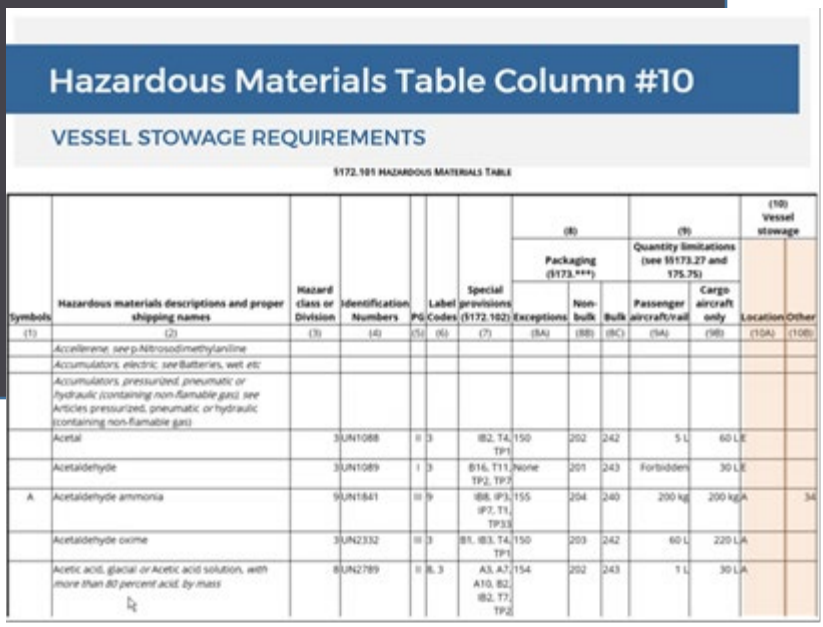
NARRATION:

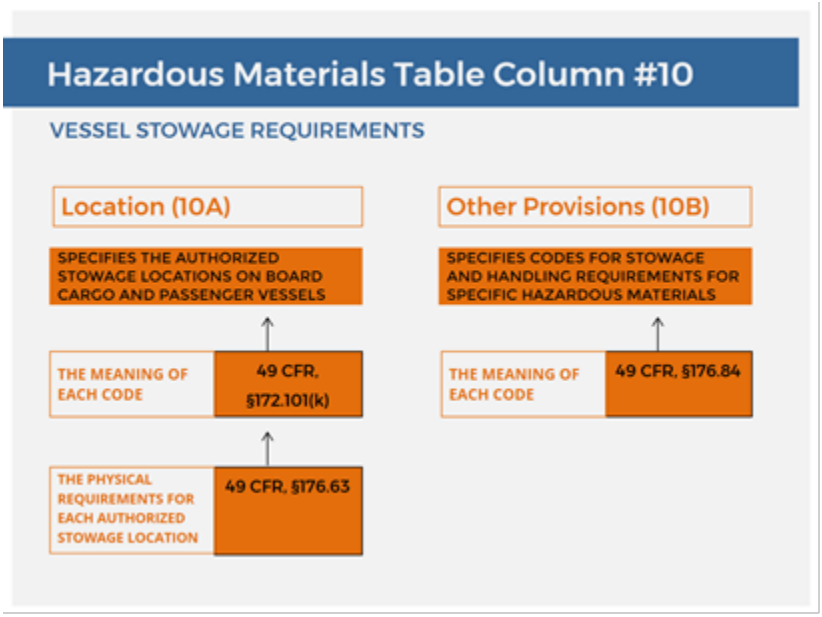
Column 9A specifies the maximum quantities that may be offered for transportation in one package by passenger-carrying aircraft or passenger-carrying rail car.

Column 9B specifies the maximum quantities that may be offered for transportation in one package by cargo aircraft only.

The **quantity limitation** is "NET" except where otherwise specified.
For example, the entry for 'Consumer Commodity' specifies a '30 kg gross' quantity limitation.

The word **"Forbidden"** means that the material may not be offered for transportation or transported by that mode of transport.





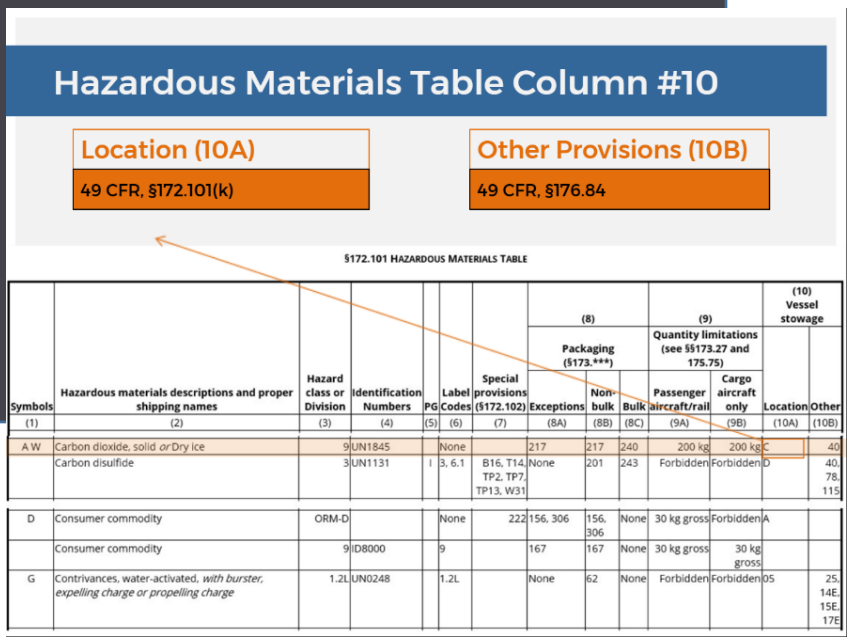
NARRATION:

Column 10 is labeled 'Vessel stowage.'
As you can see in the image, the columns "10A" and "10B" can be blank or contain codes.

Column 10A [Vessel stowage] specifies the authorized stowage locations on board cargo and passenger vessels.

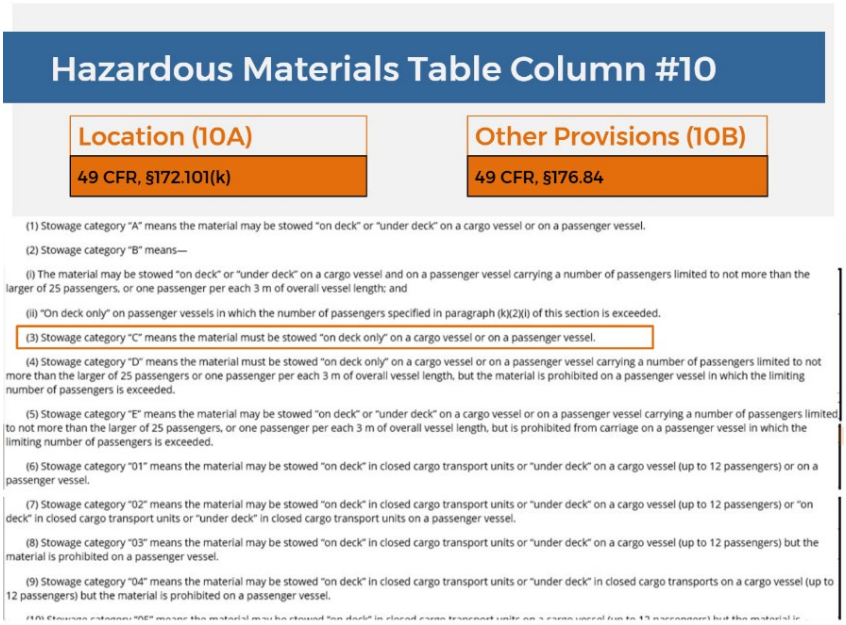
The meaning of each code in **Column 10A** is set forth in §172.101(k) of the Hazardous Materials Regulations and the physical requirements for each authorized stowage location are set forth in §176.63 of the Hazardous Materials Regulations.

Column 10B [Other provisions] specifies codes for stowage and handling requirements for specific hazardous materials.
The meaning of each code in Column 10B is set forth in §176.84 of the Hazardous Materials Regulations.



§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
A W	Carbon dioxide, solid *or* Dry ice	9	UN1845		None		217	217	240	200 kg	200 kg	C	40
	Carbon disulfide	3	UN1131	I	3, 6.1	B16, T14, TP2, TP7, TP13, W31	None	201	243	Forbidden	Forbidden	D	40, 78, 115
D	Consumer commodity	ORM-D			None	222	156, 306	156, 306	None	30 kg gross	Forbidden	A	
	Consumer commodity	9	ID8000		9		167	167	None	30 kg gross	30 kg gross		
G	Contrivances, water-activated, *with burster, expelling charge or propelling charge*	1.2L	UN0248		1.2L		None	62	None	Forbidden	Forbidden	05	25, 14E, 15E, 17E



(1) Stowage category "A" means the material may be stowed "on deck" or "under deck" on a cargo vessel or on a passenger vessel.

(2) Stowage category "B" means—

(i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and

(ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

(3) Stowage category "C" means the material must be stowed "on deck only" on a cargo vessel or on a passenger vessel.

(4) Stowage category "D" means the material must be stowed "on deck only" on a cargo vessel or on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on a passenger vessel in which the limiting number of passengers is exceeded.

(5) Stowage category "E" means the material may be stowed "on deck" or "under deck" on a cargo vessel or on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on a passenger vessel in which the limiting number of passengers is exceeded.

(6) Stowage category "01" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) or on a passenger vessel.

(7) Stowage category "02" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) or "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a passenger vessel.

(8) Stowage category "03" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

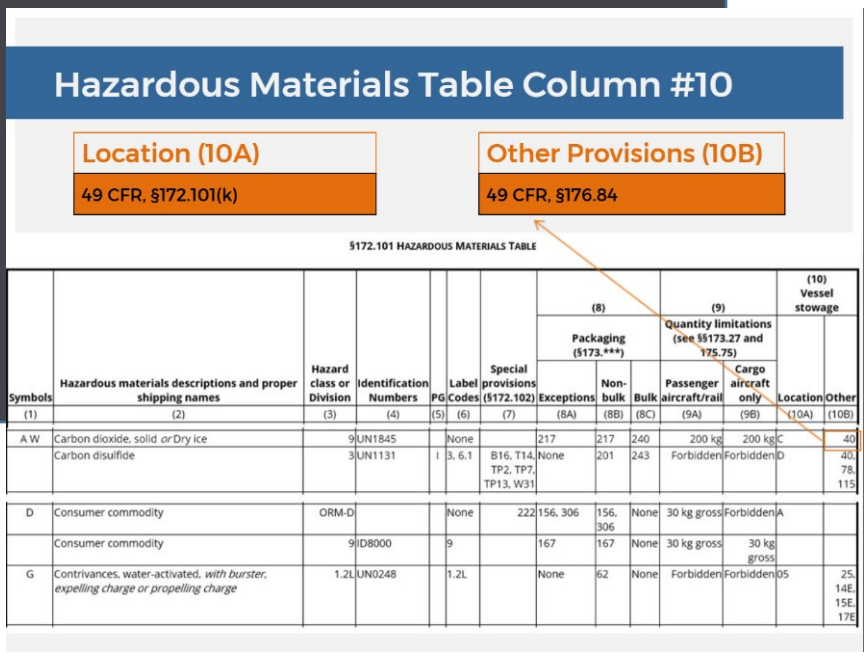
(9) Stowage category "04" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in closed cargo transports on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

(10) Stowage category "05" means the material may be stowed "on deck" in closed cargo transport units on a cargo vessel (up to 12 passengers) but the material is

NARRATION:

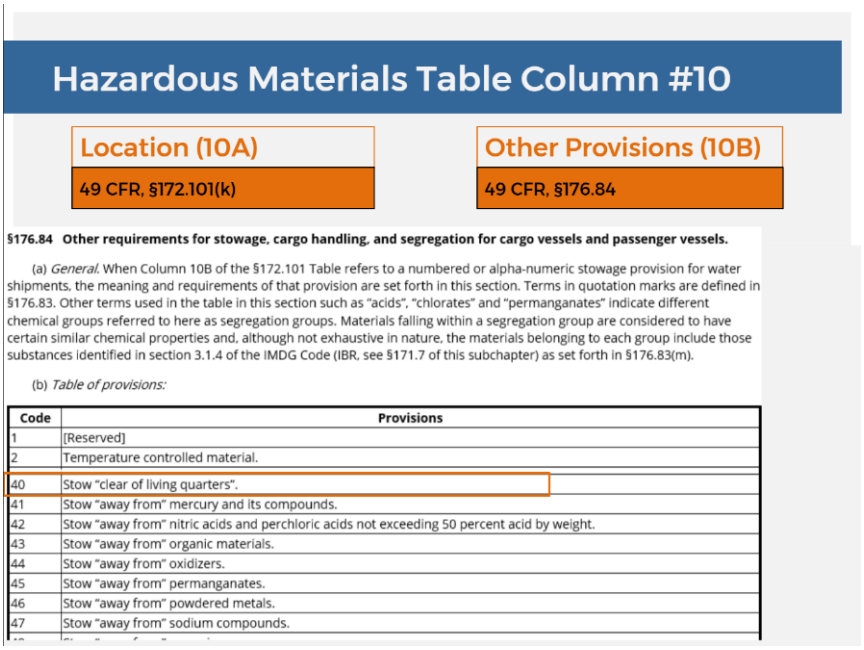
In the example highlighted here, the entry in **Column "10A"** indicates stowage category "C."

And according to §172.101(k), it means that the material must be stowed "on deck only" on a cargo vessel or on a passenger vessel.
As you can see, there are multiple stowage categories.



§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	(8) Packaging (§173.***) Non-bulk	(8) Packaging (§173.***) Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	(9) Quantity limitations (see §§173.27 and 175.75) Cargo aircraft only	(10) Vessel stowage Location	(10) Vessel stowage Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
A W	Carbon dioxide, solid *or* Dry ice	9	UN1845		None		217	217	240	200 kg	200 kg	C	40
	Carbon disulfide	3	UN1131	I	3, 6.1	B16, T14, TP2, TP7, TP13, W31	None	201	243	Forbidden	Forbidden	D	40, 78, 115
D	Consumer commodity	ORM-D			None	222	156, 306	156, 306	None	30 kg gross	Forbidden	A	
	Consumer commodity	9	ID8000		9		167	167	None	30 kg gross	30 kg gross		
G	Contrivances, water-activated, *with burster, expelling charge or propelling charge*	1.2L	UN0248		1.2L		None	62	None	Forbidden	Forbidden	05	25, 14E, 15E, 17E



§176.84 Other requirements for stowage, cargo handling, and segregation for cargo vessels and passenger vessels.

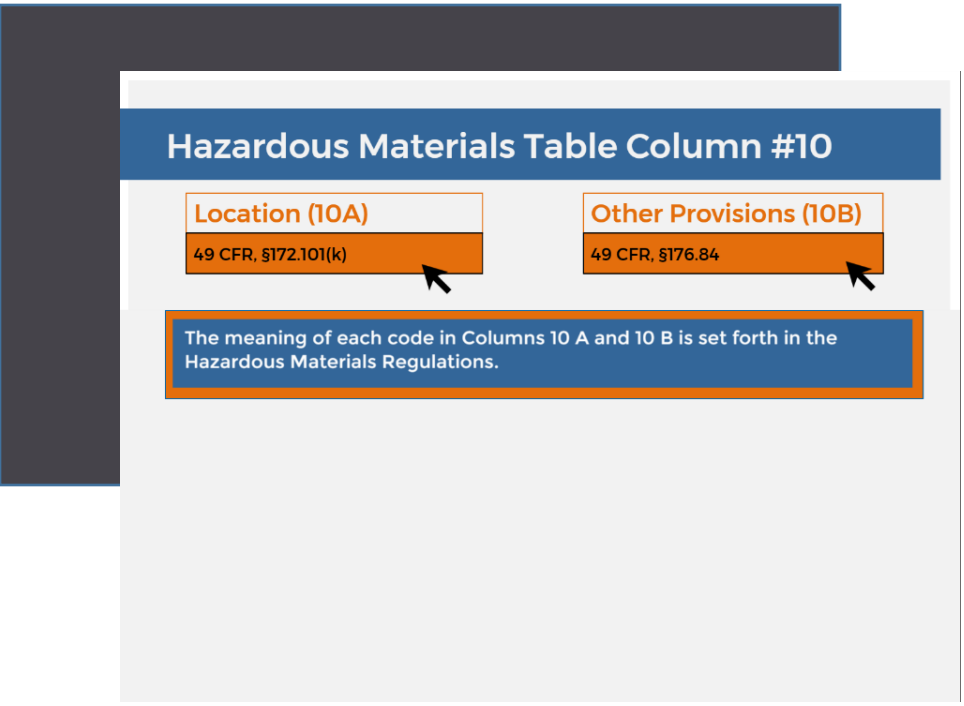
(a) *General.* When Column 10B of the §172.101 Table refers to a numbered or alpha-numeric stowage provision for water shipments, the meaning and requirements of that provision are set forth in this section. Terms in quotation marks are defined in §176.83. Other terms used in the table in this section such as "acids", "chlorates" and "permanganates" indicate different chemical groups referred to here as segregation groups. Materials falling within a segregation group are considered to have certain similar chemical properties and, although not exhaustive in nature, the materials belonging to each group include those substances identified in section 3.1.4 of the IMDG Code (IBR, see §171.7 of this subchapter) as set forth in §176.83(m).

(b) *Table of provisions:*

Code	Provisions
1	[Reserved]
2	Temperature controlled material.
40	Stow "clear of living quarters".
41	Stow "away from" mercury and its compounds.
42	Stow "away from" nitric acids and perchloric acids not exceeding 50 percent acid by weight.
43	Stow "away from" organic materials.
44	Stow "away from" oxidizers.
45	Stow "away from" permanganates.
46	Stow "away from" powdered metals.
47	Stow "away from" sodium compounds.

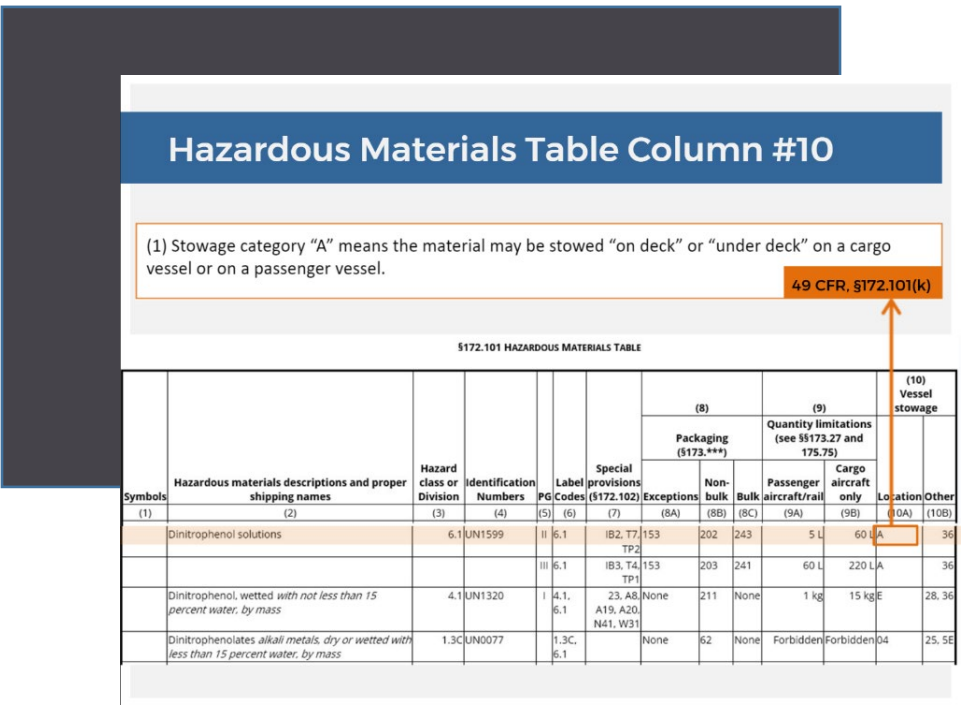
NARRATION

The entry in **Column "10B"** indicates that stowage provision "40" applies, which, according to CFR, §176.84, prescribes that this material must be stowed "clear of living quarters."



NARRATION:

The meaning of each code in Columns 10A and 10B is set forth in the Hazardous Materials Regulations.

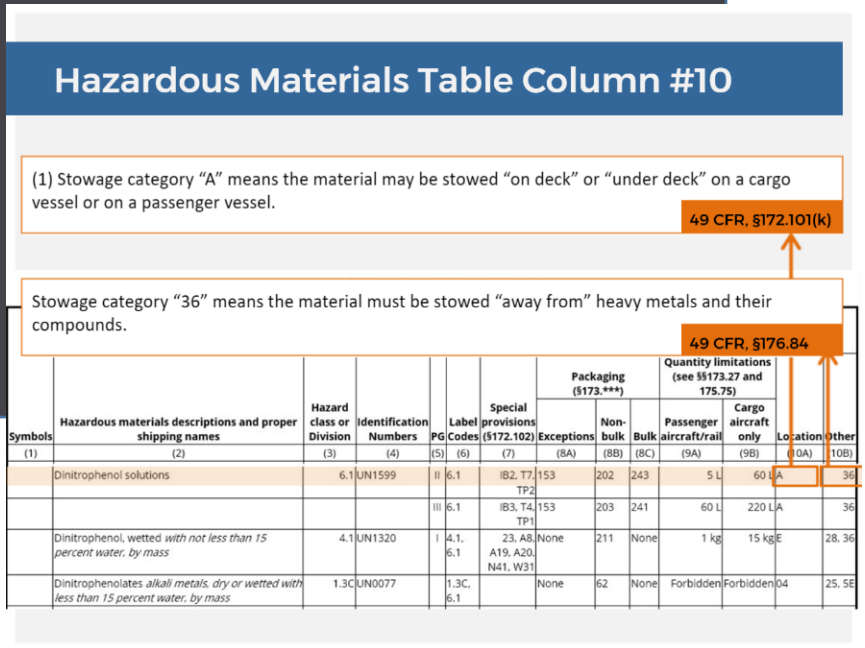


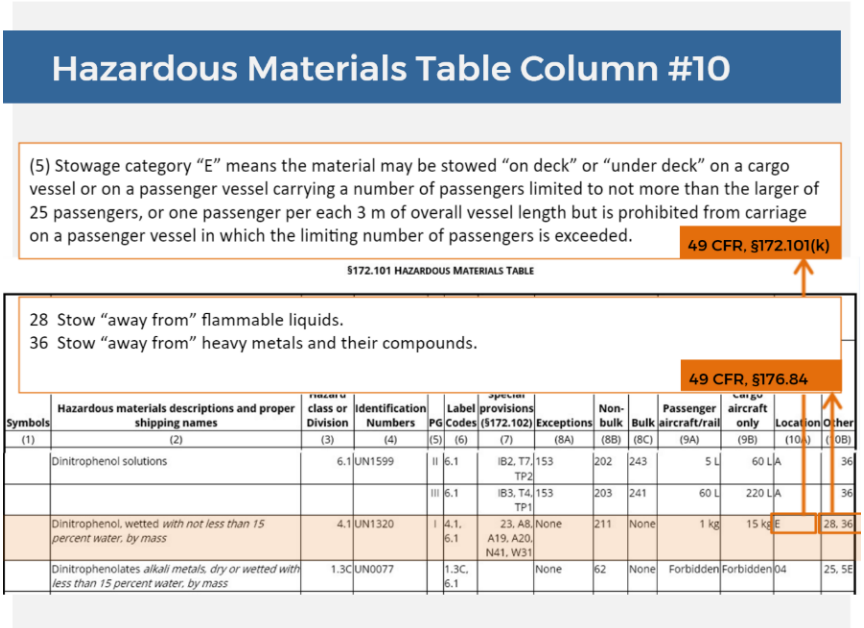
§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Dinitrophenol solutions	6.1	UN1599	II	6.1	IB2, T7, TP2	153	202	243	5 L	60 L	A	36
				III	6.1	IB3, T4, TP1	153	203	241	60 L	220 L	A	36
	Dinitrophenol, wetted *with not less than 15 percent water, by mass*	4.1	UN1320	I	4.1, 6.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	Dinitrophenolates *alkali metals, dry or wetted with less than 15 percent water, by mass*	1.3C	UN0077		1.3C, 6.1		None	62	None	Forbidden	Forbidden	04	25, 5E

Let's look at a few examples.
For the entry 'Dinitrophenol solutions,' packing group II (which means medium danger).

Stowage category "A" means the material may be stowed "on deck" or "under deck" on a cargo vessel or on a passenger vessel, according to the Subpart B- Hazardous Materials Table, §172.101(k).





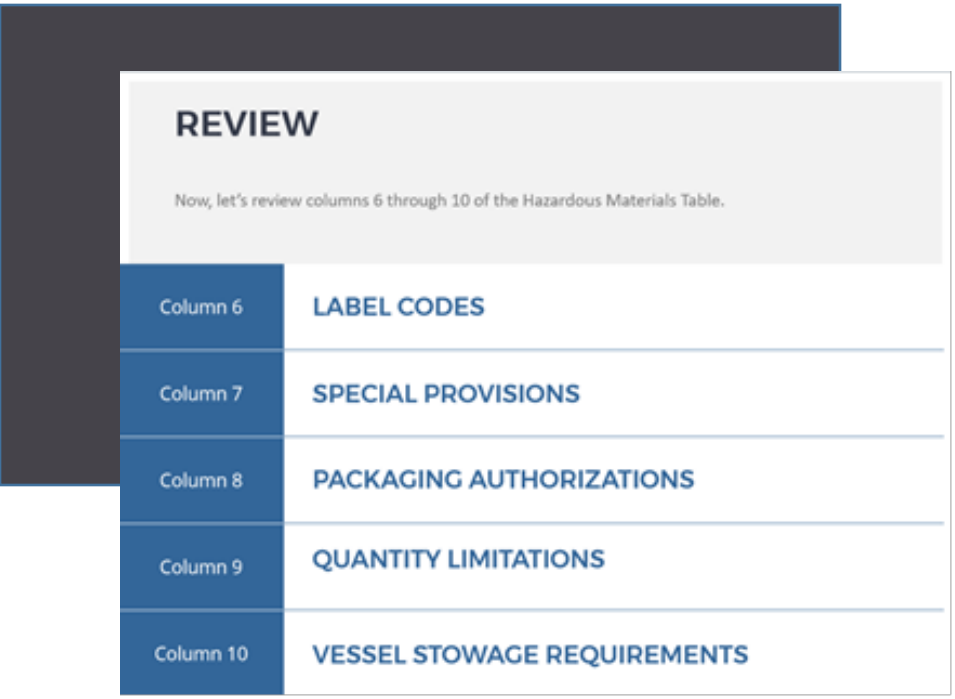
NARRATION:

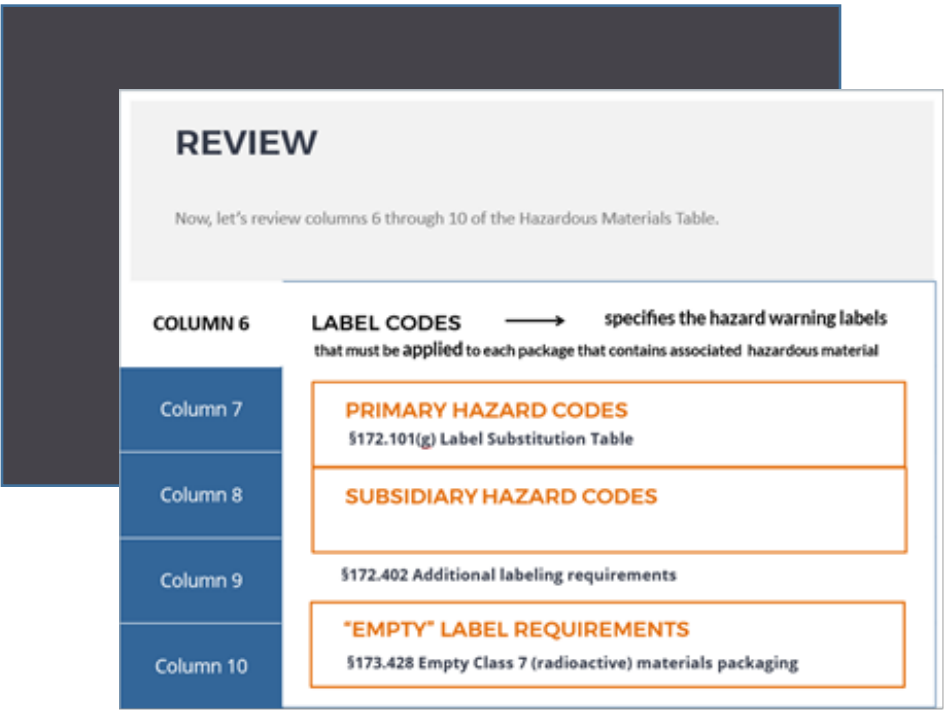
Stowage provision "36" means the material must be stowed "away from" heavy metals and their compounds, according to §176.84. For the entry, 'Dinitrophenol, wetted with not less than 15 percent water, by mass.'

Stowage category "E" means the material may be stowed "on deck" or "under deck" on a cargo vessel or on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3m of overall vessel length but is prohibited from carriage on a passenger vessel in which the limiting number of passengers is exceeded, according to the Subpart B-Hazardous Materials Table, §172.101(k).

There are two categories assigned for this entry in the **column 10B.**

- **Stowage provision "28"** means the material must be stowed "away from flammable liquids."
- **Stowage provision "36"** means the material must be stowed "away from" heavy metals and their compounds, according to §176.84.





NARRATION:

Now, let's review columns 6 through 10 of the Hazardous Materials Table.

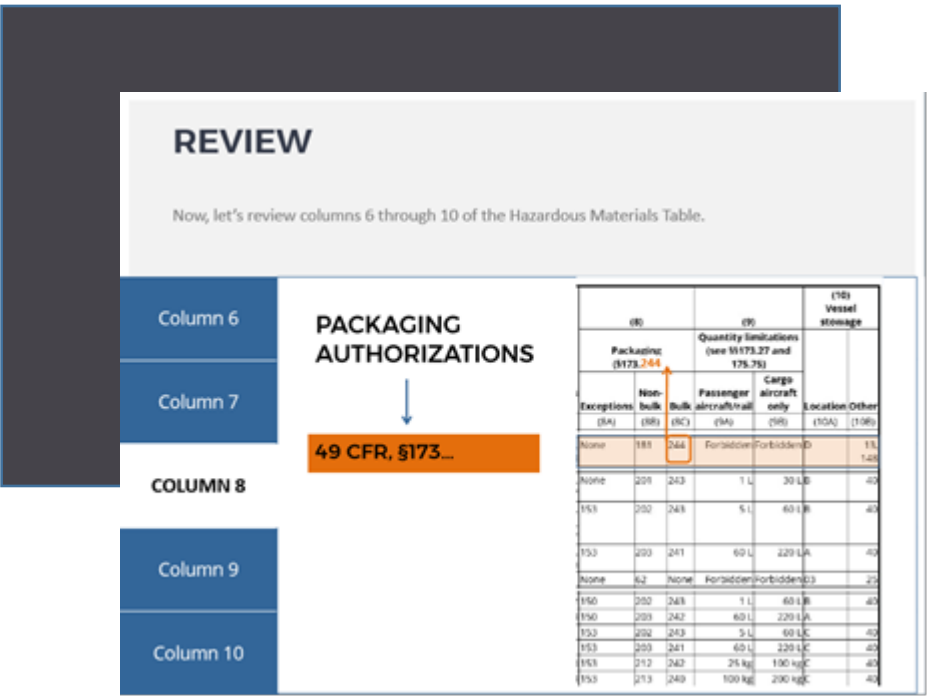
Column #6:
Column #6 **Label Codes** specifies the hazard warning labels that must be applied to each package that contains associated hazardous material.
If two or more label codes are listed, the first represents the **primary hazard** and the other(s) represent the **subsidiary hazard(s).**
The codes contained in Column #6 are defined according to the Label Substitution Table found in section 172.101(g).

Additional labeling requirements are found in section 172.402.
For "Empty" label requirements, see §173.428 of the Hazardous Materials Regulations.

NARRATION:

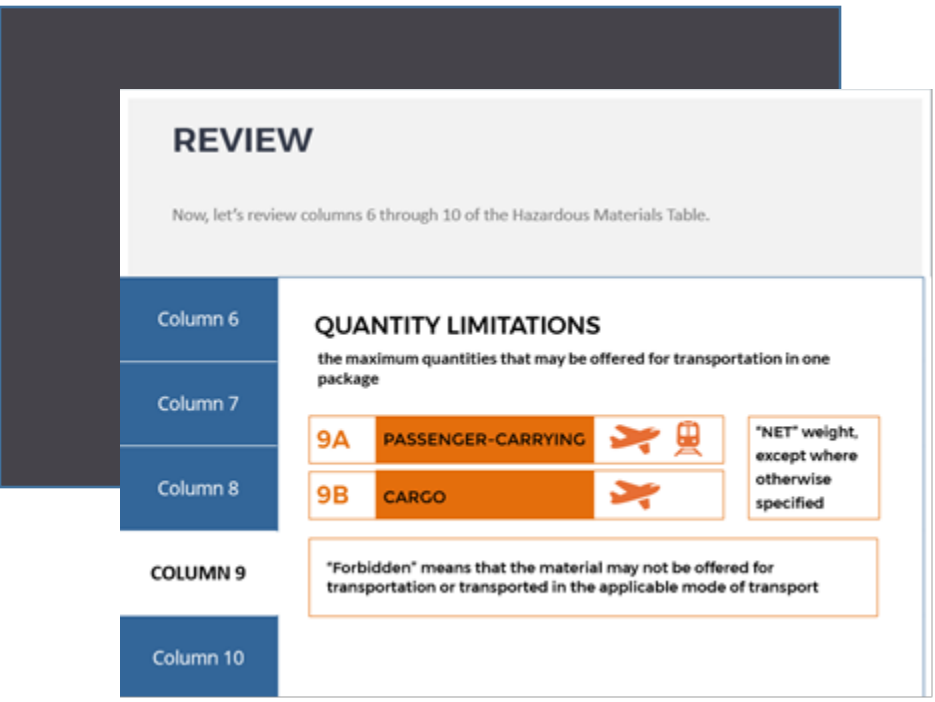
Column #7:
In Column 7, you will find codes for **special provisions** applicable to hazardous materials in addition to the standard requirements.

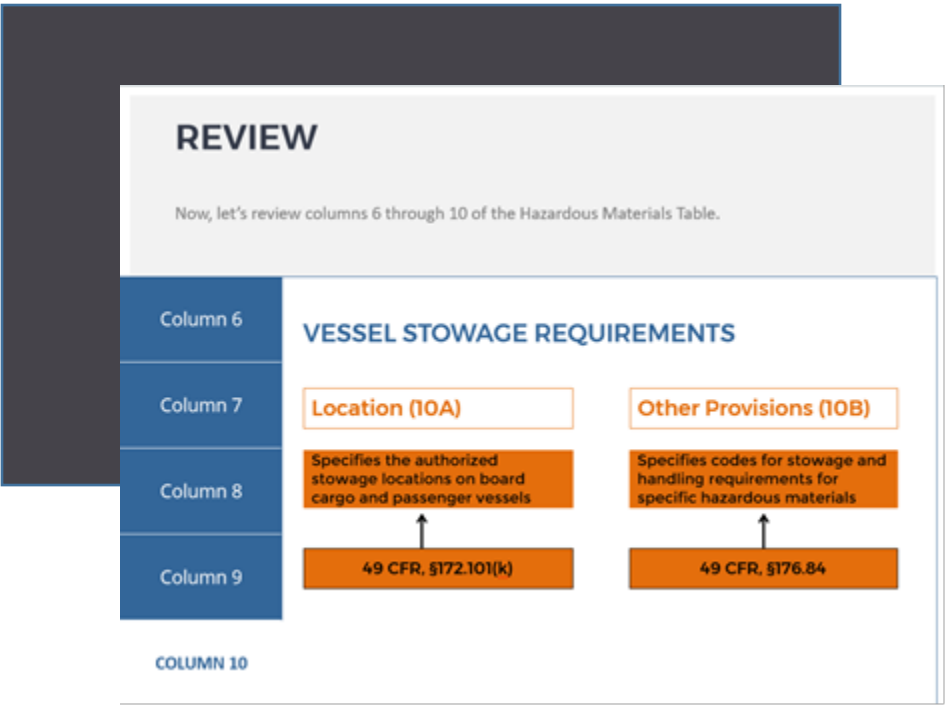
The meaning and requirements of special provisions are as set forth in section 172.102.



Column #8:
A **three-digit number** in Columns 8A, 8B, or 8C refers to the segment that is associated with that number in §173 of the Hazardous Materials Regulations.

It will contain additional packaging requirements or exceptions.





NARRATION:

Column #9: Column #9 Quantity Limitations is divided into two parts.
Column 9A specifies the maximum quantities that may be offered for transportation in one package for a passenger-carrying aircraft or passenger-carrying rail car.
Column 9B specifies the maximum quantities that may be offered for transportation in one package for cargo aircraft only. Quantities are a "net" weight/quantity limitation unless a "gross" weight is specified.
The word "Forbidden" indicates that the material may not be offered for transportation or transported by that mode of transport.

Column #10:
Column #10 is labeled Vessel stowage and is divided into two parts: **Column 10A** specifies the authorized stowage locations for hazardous materials, on-board cargo, and passenger vessels. This information can be found in §172.101(k) of the Hazardous Materials Regulations.
Column 10B specifies codes for stowage requirements for specific hazardous materials. The meaning of each code in Column 10B is set forth in §176.84 of the Hazardous Materials Regulations.

Matching

Information for the Basic Description comes directly from the HMT. Below are two images, Picture 1 is an example of a Basic Description, and Picture 2 is an excerpt from the HMT.

The following information is found in each picture below. Label the following items found in each picture. Use the red boxes to record your answers.

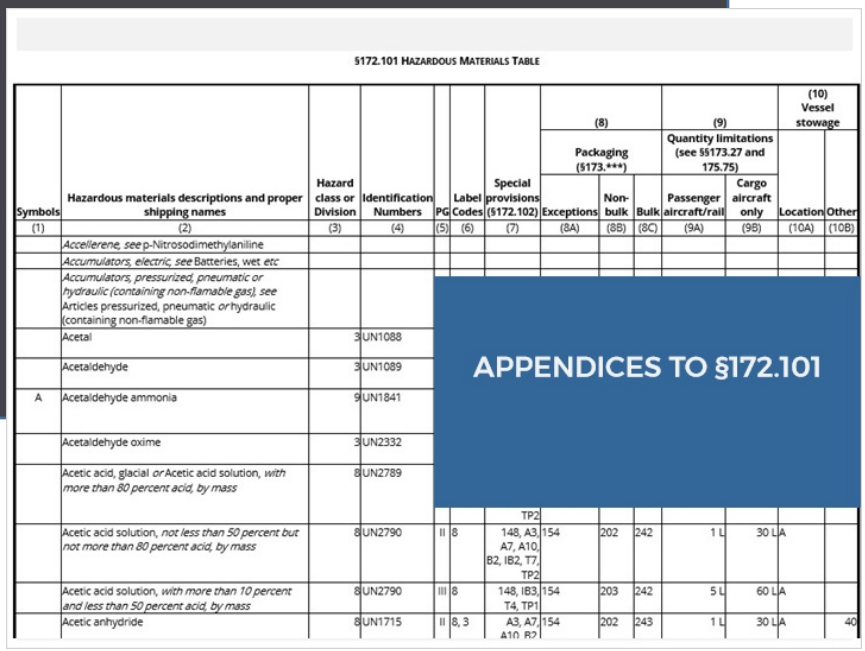
A. **Identification number**
B. **Proper shipping name**
C. **Hazard class or division**
D. **Packing Group (PG)**

Picture 1:

No. of Units & Container Type	HM	BASIC DESCRIPTION Identification Number (UN or NA), Proper Shipping Name, Hazard Class, Packing Group, per 172.101, 172.202, 172.203	TOTAL QUANTITY (Weight, Volume, Gallons, etc.)
1 Box		Carriage Bolts	1000 lbs
4 Drums	X	UN1805, Phosphoric acid solution, 8, PGIII	4 gal
1 Drum	X	UN1993, Flammable liquids, n.o.s.	18 gal
		(contains methanol), 3, PGIII	

Picture 2:

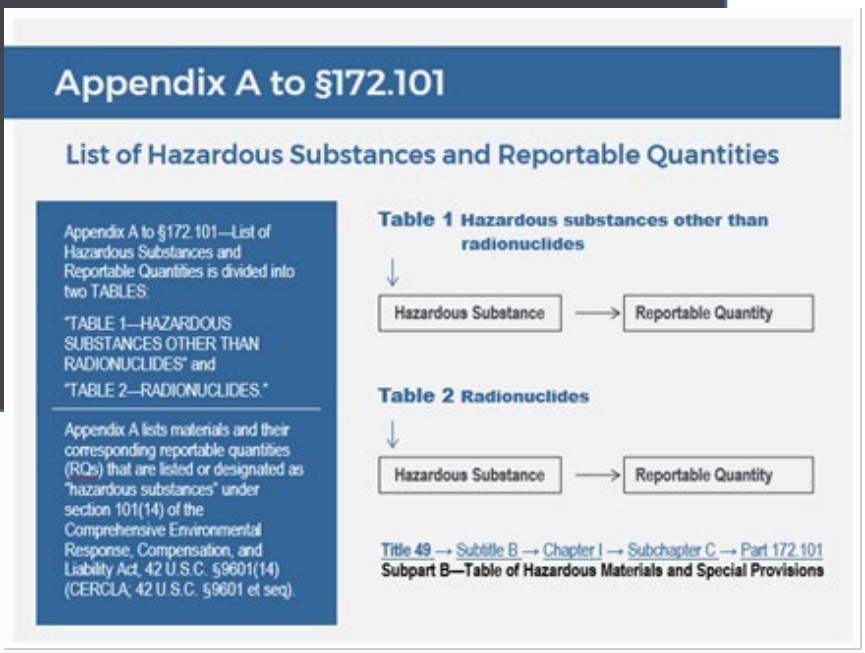
Sym-bols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identi-fication Numbers	PG	Label Codes	Special provisions (§ 172.102)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Phosphine	2.3	UN2199		2.3, 2.1.	1
	Phosphoric acid solution	8	UN1805	III	8	A7, IB3, N34, T4, TP1
	Phosphoric acid, solid	8	UN3453	III	8	IB8, IP3, T1, TP33
	Phosphoric acid triethyleneimine, see Tris-(1-aziridiyl)phosphine oxide, solution.					



§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***) Exceptions	Non-bulk	Bulk	(9) Quantity limitations (see §§173.27 and 175.75) Passenger aircraft/rail	Cargo aircraft only	(10) Vessel stowage Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Accellerene, see p-Nitrosodimethylaniline												
	Accumulators, electric, see Batteries, wet *etc*												
	Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas), see Articles pressurized, pneumatic *or* hydraulic (containing non-flamable gas)												
	Acetal		3 UN1088										
	Acetaldehyde		3 UN1089										
A	Acetaldehyde ammonia		9 UN1841										
	Acetaldehyde oxime		3 UN2332										
	Acetic acid, glacial *or* Acetic acid solution, *with more than 80 percent acid, by mass*		8 UN2789										
						TP2							
	Acetic acid solution, *not less than 50 percent but not more than 80 percent acid, by mass*		8 UN2790	II	8	148, A3, A7, A10, B2, IB2, T7, TP2	154	202	242	1 L	30 L	A	
	Acetic acid solution, *with more than 10 percent and less than 50 percent acid, by mass*		8 UN2790	III	8	148, IB3, T4, TP1	154	203	242	5 L	60 L	A	
	Acetic anhydride		8 UN1715	II	8, 3	A3, A7, A10, B2	154	202	243	1 L	30 L	A	40

APPENDICES TO §172.101



Appendix A to §172.101

List of Hazardous Substances and Reportable Quantities

Appendix A to §172.101—List of Hazardous Substances and Reportable Quantities is divided into two TABLES:

"TABLE 1—HAZARDOUS SUBSTANCES OTHER THAN RADIONUCLIDES" and

"TABLE 2—RADIONUCLIDES."

Appendix A lists materials and their corresponding reportable quantities (RQs) that are listed or designated as "hazardous substances" under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §9601(14) (CERCLA; 42 U.S.C. §9601 et seq).

Table 1 Hazardous substances other than radionuclides

Hazardous Substance	→	Reportable Quantity

Table 2 Radionuclides

Hazardous Substance	→	Reportable Quantity

Title 49 → Subtitle B → Chapter I → Subchapter C → Part 172.101
Subpart B—Table of Hazardous Materials and Special Provisions

NARRATION:

Now, let's review Appendices A and B to the Hazardous Materials Table.

Appendix A to §172.101 - List of Hazardous Substances and Reportable Quantities is divided into **two Tables**:

- "Table 1-Hazardous Substances Other Than Radionuclides"
- and "Table 2-Radionuclides."

Appendix A lists materials and their corresponding reportable quantities that are listed or designated as **"hazardous substances"** under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9601(14).

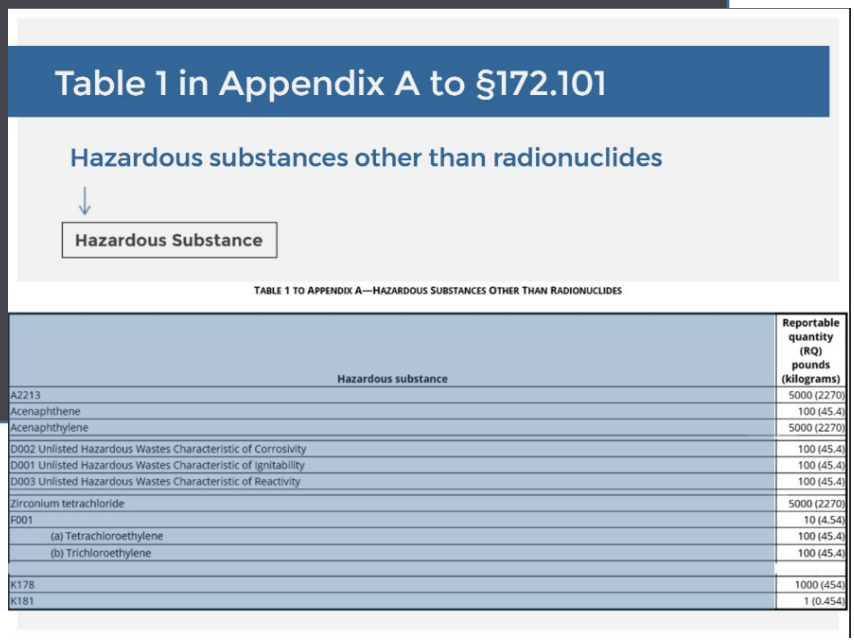


Table 1 in Appendix A to §172.101

Hazardous substances other than radionuclides

↓

Hazardous Substance

TABLE 1 TO APPENDIX A—HAZARDOUS SUBSTANCES OTHER THAN RADIONUCLIDES

Hazardous substance	Reportable quantity (RQ) pounds (kilograms)
A2213	5000 (2270)
Acenaphthene	100 (45.4)
Acenaphthylene	5000 (2270)
D002 Unlisted Hazardous Wastes Characteristic of Corrosivity	100 (45.4)
D001 Unlisted Hazardous Wastes Characteristic of Ignitability	100 (45.4)
D003 Unlisted Hazardous Wastes Characteristic of Reactivity	100 (45.4)
Zirconium tetrachloride	5000 (2270)
F001	10 (4.54)
(a) Tetrachloroethylene	100 (45.4)
(b) Trichloroethylene	100 (45.4)
K178	1000 (454)
K181	1 (0.454)

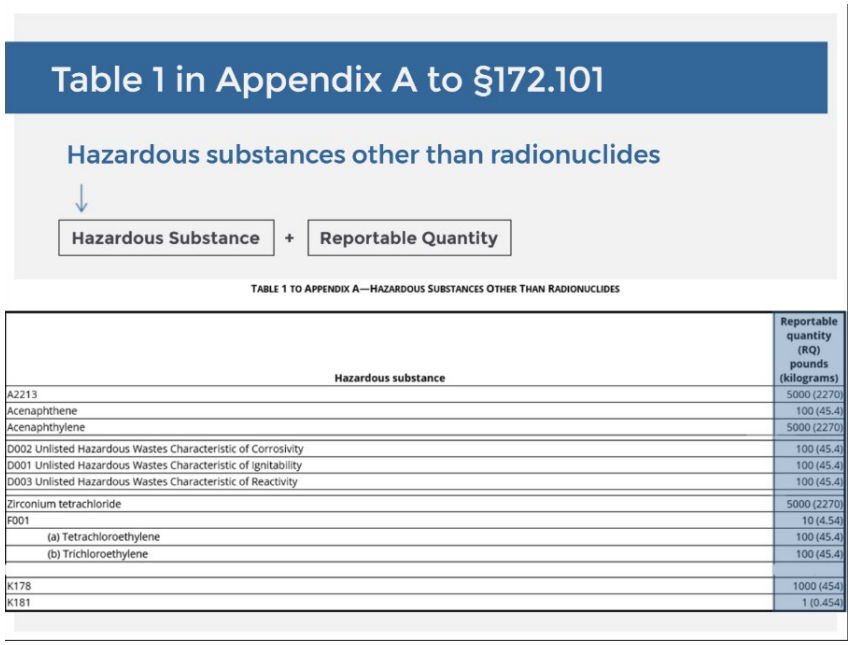


Table 1 in Appendix A to §172.101

Hazardous substances other than radionuclides

↓

Hazardous Substance + Reportable Quantity

TABLE 1 TO APPENDIX A—HAZARDOUS SUBSTANCES OTHER THAN RADIONUCLIDES

Hazardous substance	Reportable quantity (RQ) pounds (kilograms)
A2213	5000 (2270)
Acenaphthene	100 (45.4)
Acenaphthylene	5000 (2270)
D002 Unlisted Hazardous Wastes Characteristic of Corrosivity	100 (45.4)
D001 Unlisted Hazardous Wastes Characteristic of Ignitability	100 (45.4)
D003 Unlisted Hazardous Wastes Characteristic of Reactivity	100 (45.4)
Zirconium tetrachloride	5000 (2270)
F001	10 (4.54)
(a) Tetrachloroethylene	100 (45.4)
(b) Trichloroethylene	100 (45.4)
K178	1000 (454)
K181	1 (0.454)

NARRATION:

Elements and compounds that were designated as **hazardous substances** are listed in Column 1 of Table 1.
A listing of waste streams appear in numerical sequence and are referenced by the appropriate "D," "F," or "K" numbers.

Column 2 of Table 1, entitled "**Reportable Quantity** (RQ)."

For each hazardous substance listed in Column 1 of Table 1, it contains the reportable quantity, in pounds and kilograms.

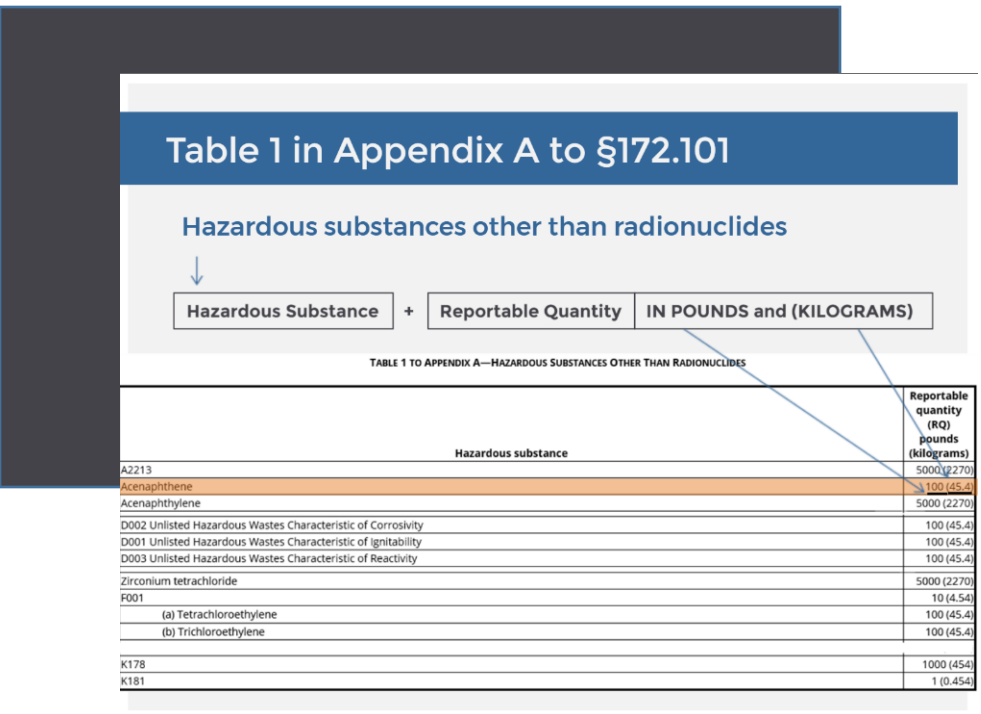


TABLE 1 TO APPENDIX A—HAZARDOUS SUBSTANCES OTHER THAN RADIONUCLIDES

Hazardous substance	Reportable quantity (RQ) pounds (kilograms)
A2213	5000 (2270)
Acenaphthene	100 (45.4)
Acenaphthylene	5000 (2270)
D002 Unlisted Hazardous Wastes Characteristic of Corrosivity	100 (45.4)
D001 Unlisted Hazardous Wastes Characteristic of Ignitability	100 (45.4)
D003 Unlisted Hazardous Wastes Characteristic of Reactivity	100 (45.4)
Zirconium tetrachloride	5000 (2270)
F001	10 (4.54)
(a) Tetrachloroethylene	100 (45.4)
(b) Trichloroethylene	100 (45.4)
K178	1000 (454)
K181	1 (0.454)

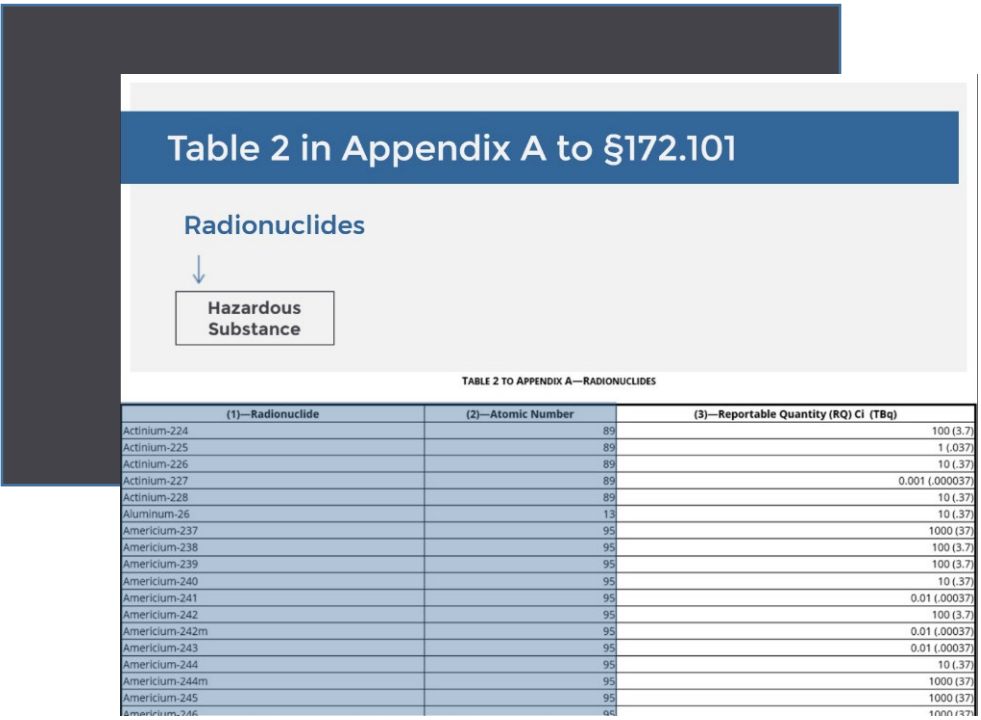


TABLE 2 TO APPENDIX A—RADIONUCLIDES

(1)—Radionuclide	(2)—Atomic Number	(3)—Reportable Quantity (RQ) Ci (TBq)
Actinium-224	89	100 (3.7)
Actinium-225	89	1 (.037)
Actinium-226	89	10 (.37)
Actinium-227	89	0.001 (.000037)
Actinium-228	89	10 (.37)
Aluminum-26	13	10 (.37)
Americium-237	95	1000 (37)
Americium-238	95	100 (3.7)
Americium-239	95	100 (3.7)
Americium-240	95	10 (.37)
Americium-241	95	0.01 (.00037)
Americium-242	95	100 (3.7)
Americium-242m	95	0.01 (.00037)
Americium-243	95	0.01 (.00037)
Americium-244	95	10 (.37)
Americium-244m	95	1000 (37)
Americium-245	95	1000 (37)
Americium-246	95	1000 (37)

NARRATION:

The first number in the second column lists Reportable Quantity in **pounds**, and the number inside the parentheses is Reportable Quantity in **kilograms**.

For example, for the entry A2213, reportable quantity is 5000 pounds or 2270 kilograms.
For the entry Acenaphthene, reportable quantity is 100 pounds or 45.4 kilograms.

Table two to Appendix A lists **radionuclides** that are hazardous substances and their corresponding reportable quantities.

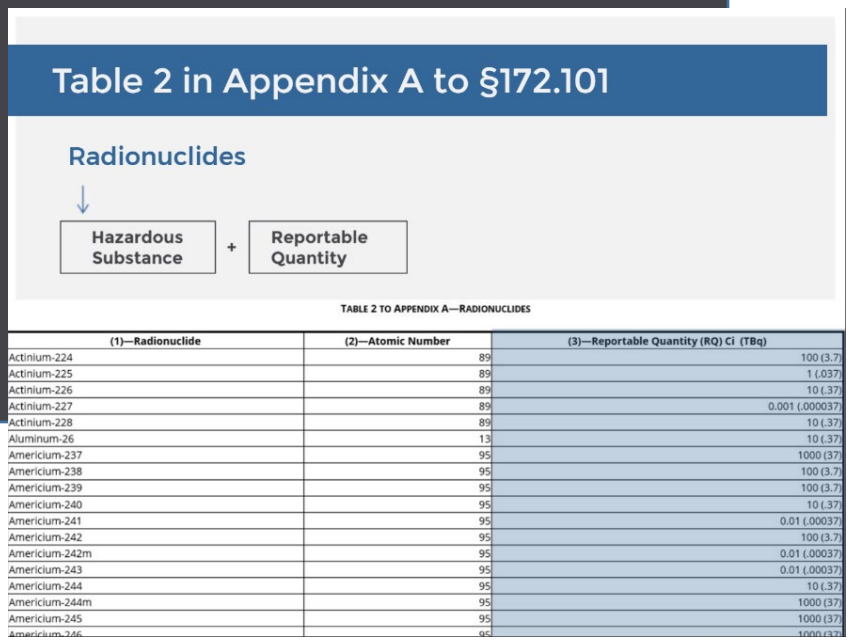


TABLE 2 TO APPENDIX A—RADIONUCLIDES

(1)—Radionuclide	(2)—Atomic Number	(3)—Reportable Quantity (RQ) Ci (TBq)
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Actinium-226	89	10 (.37)
Actinium-227	89	0.001 (.000037)
Actinium-228	89	10 (.37)
Aluminum-26	13	10 (.37)
Americium-237	95	1000 (37)
Americium-238	95	100 (3.7)
Americium-239	95	100 (3.7)
Americium-240	95	10 (.37)
Americium-241	95	0.01 (.00037)
Americium-242	95	100 (3.7)
Americium-242m	95	0.01 (.00037)
Americium-243	95	0.01 (.00037)
Americium-244	95	10 (.37)
Americium-244m	95	1000 (37)
Americium-245	95	1000 (37)
Americium-246	95	1000 (37)

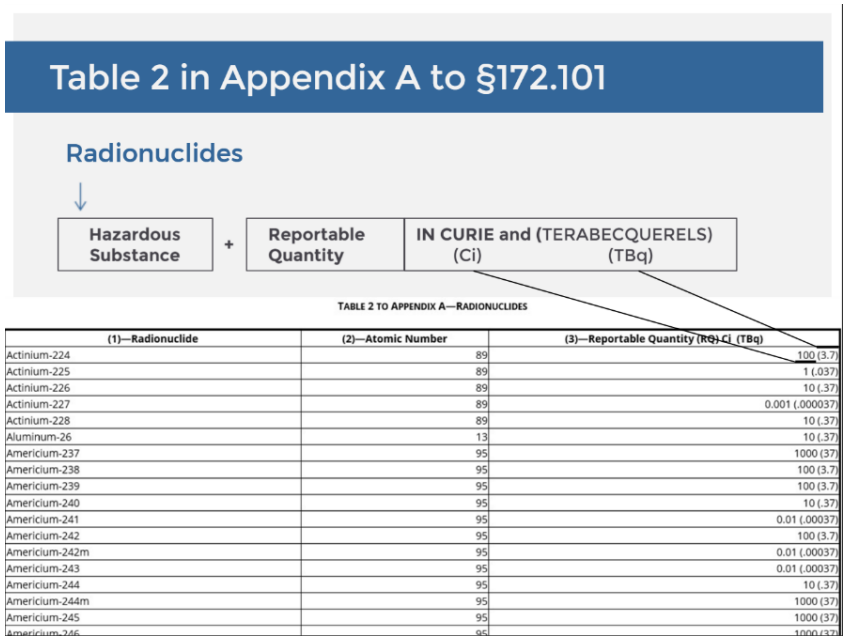
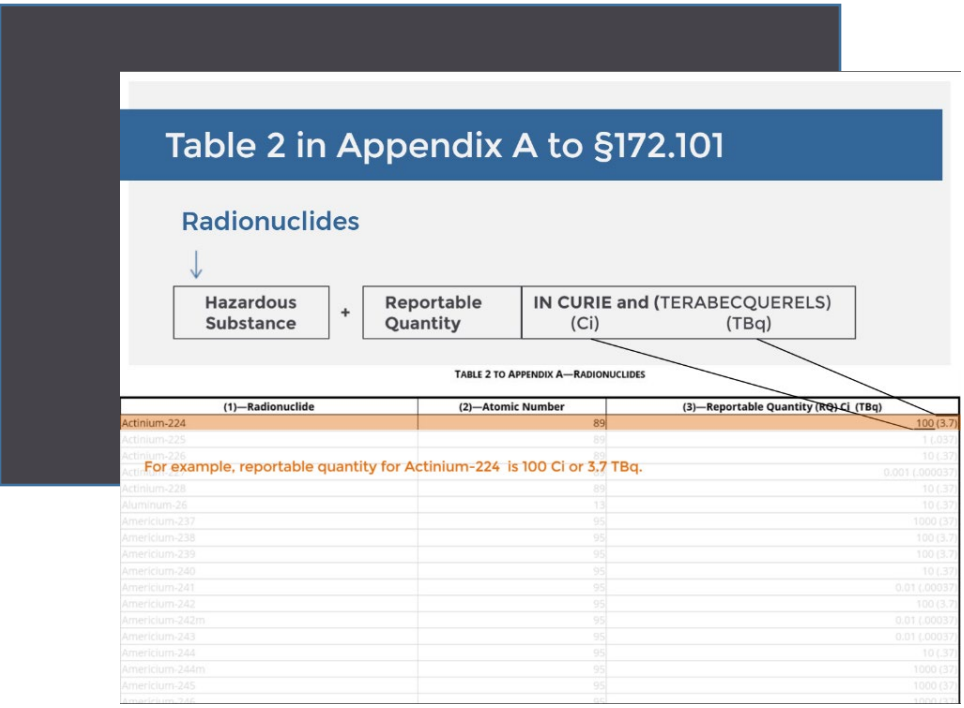


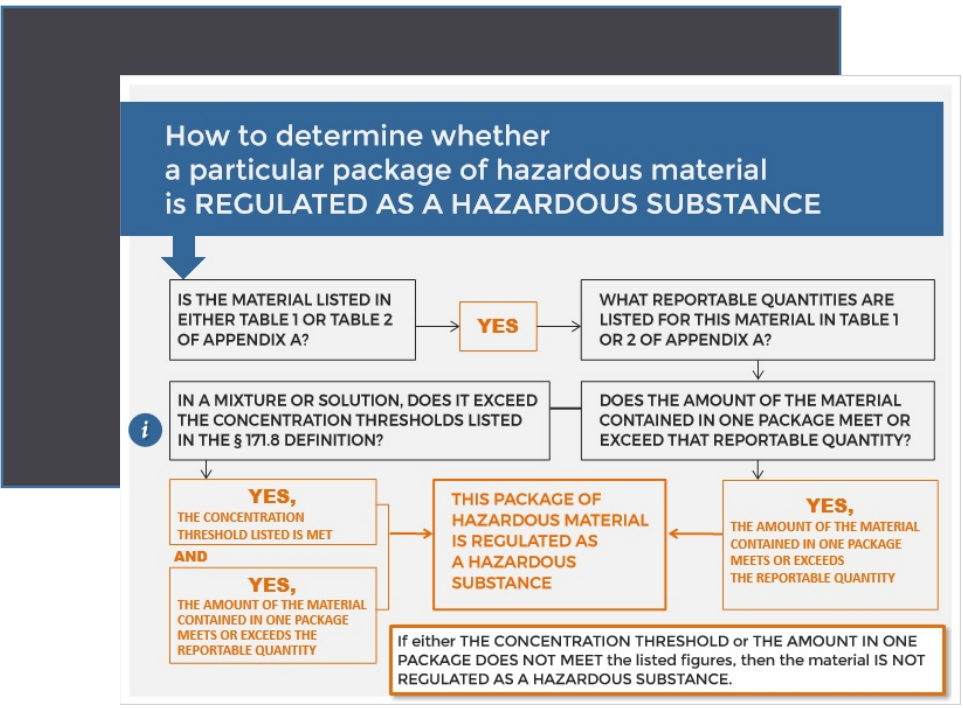
TABLE 2 TO APPENDIX A—RADIONUCLIDES

(1)—Radionuclide	(2)—Atomic Number	(3)—Reportable Quantity (RQ) Ci (TBq)
Actinium-224	89	100 (3.7)
Actinium-225	89	1 (.037)
Actinium-226	89	10 (.37)
Actinium-227	89	0.001 (.000037)
Actinium-228	89	10 (.37)
Aluminum-26	13	10 (.37)
Americium-237	95	1000 (37)
Americium-238	95	100 (3.7)
Americium-239	95	100 (3.7)
Americium-240	95	10 (.37)
Americium-241	95	0.01 (.00037)
Americium-242	95	100 (3.7)
Americium-242m	95	0.01 (.00037)
Americium-243	95	0.01 (.00037)
Americium-244	95	10 (.37)
Americium-244m	95	1000 (37)
Americium-245	95	1000 (37)
Americium-246	95	1000 (37)

NARRATION:

The **reportable quantities** for radionuclides are given in the radiological unit of measure of curie, abbreviated "CI," followed, in parentheses, by an equivalent unit measured in terabecquerels, abbreviated "TBq."





NARRATION:

For example, reportable quantity for Actinium-224 is 100 curie or 3.7 terabecquerels.

Now, after we reviewed Appendix A to the Hazardous Materials Table, we can see its real-life application as we determine whether a particular package of hazardous material is regulated as a **hazardous substance**.

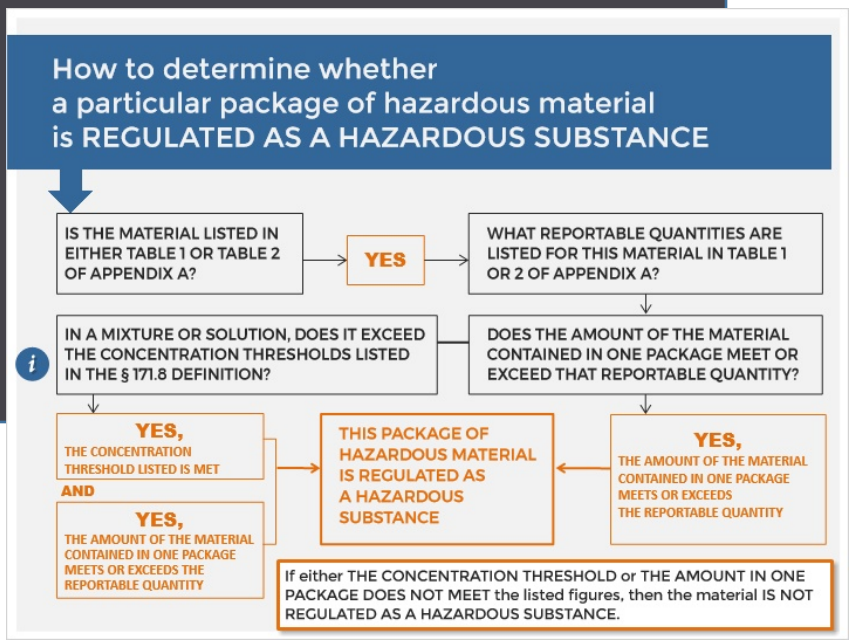
First, is the material listed in either **table 1** or **table 2** of Appendix A?

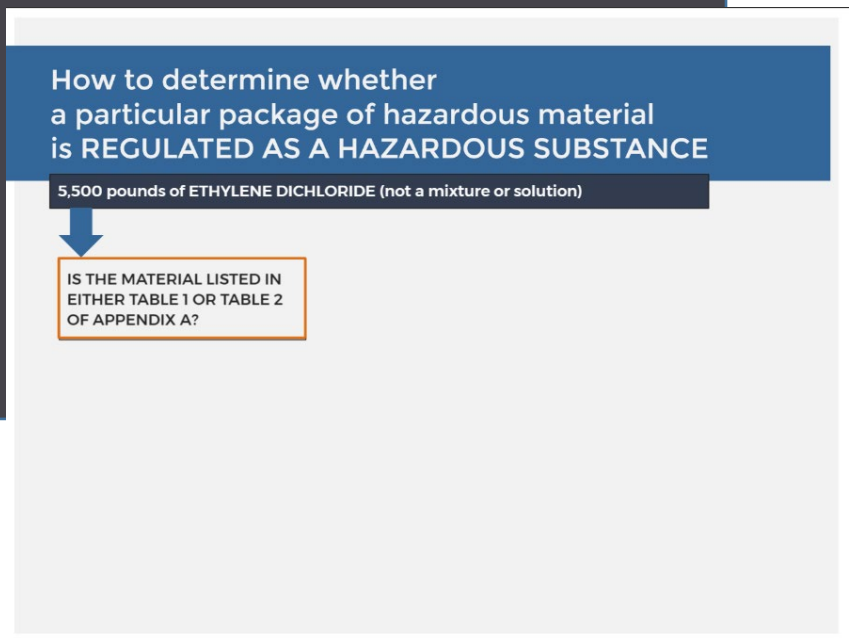
If the answer is yes, then look at **reportable quantities** listed in Table 1 or 2.

Then, determine if the amount of the material contained in one package **meets or exceeds** the reportable quantity?

If yes, then this package of hazardous material is regulated as a **hazardous substance**.

Note, that in a mixture or solution, look at the concentration thresholds listed in the §171.8 definition.





NARRATION:

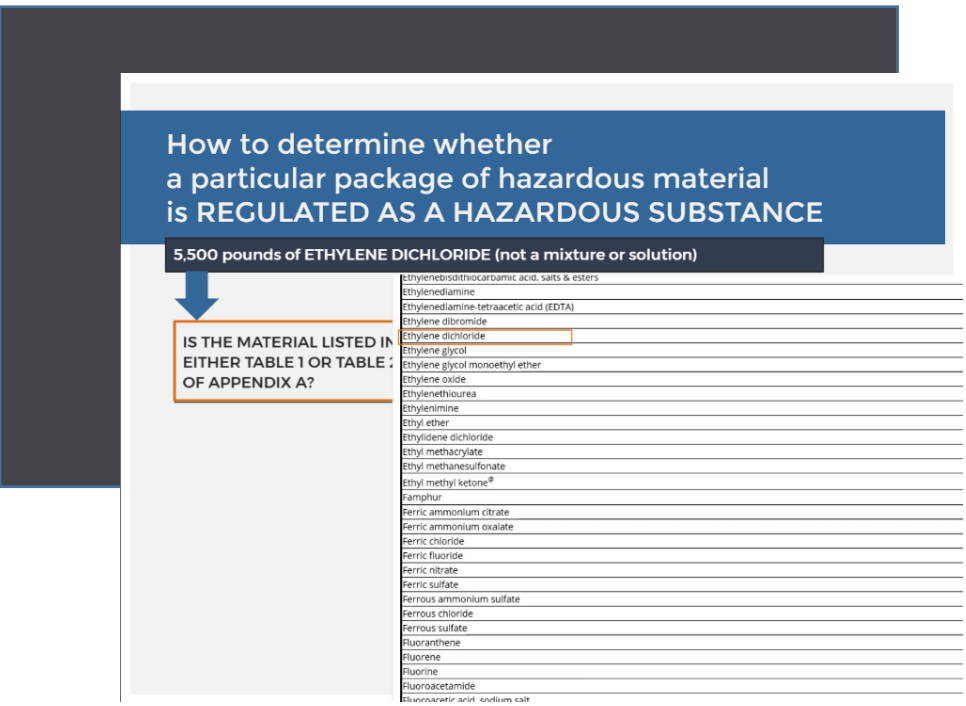
If the **concentration threshold is met** and the amount of the material contained in one package meets or exceeds the reportable quantity, then this package of hazardous material is **regulated** as a hazardous substance.
If either the concentration threshold or the amount in one package **does not meet** the listed figures, then the material is **not regulated** as a hazardous substance.

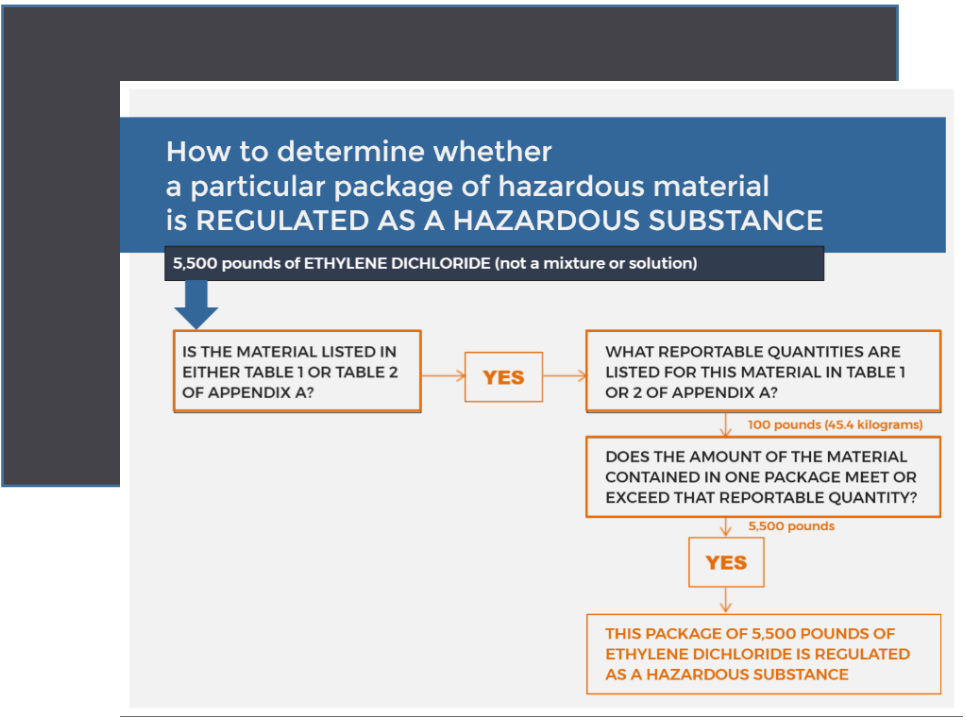
For example, we have 5,500 pounds of pure Ethylene Dichloride (not a mixture or solution).

Let's go through the steps to determine whether this package containing Ethylene Dichloride is regulated as a **hazardous substance.**

The first question to answer is this: Is the material listed in either Table 1 OR Table 2 of Appendix A?

Let's find out.





NARRATION:

Yes, it's listed.

The next question is:
What **reportable quantities** are listed for this material in Table 1 OR 2 of Appendix A?

According to Appendix A, the reportable quantity is 100 pounds or 45.4 kilograms.

And the last question to ask is:
Does the amount of the material contained in one package **meet OR exceed** that reportable quantity?

And the answer is yes because the reportable quantity is 100 pounds and our package contains 5,500.
This package of 5,500 pounds of ethylene dichloride is regulated as a hazardous substance.

Think It Through

To determine if a material is regulated you will need to navigate the HMT. Here is an example of how you would apply the principles covered in this module.

Step 1: Identify if "Ethylene dichloride," as packaged, is a hazardous substance for the purpose of transportation.

Sym-bols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identi-fication Numbers	PG
(1)	(2)	(3)	(4)	(5)
	Ethylene dibromide and methyl bromide liquid mixtures, see Methyl bromide and ethylene dibromide, liquid mixtures.			
	Ethylene dichloride	3	UN1184	II
	Ethylene glycol diethyl ether	3	UN1153	II
				III

Step 2: Identify the quantity of the hazardous substance for transportation. For this example, let's assume we have 5,500 pounds of "Ethylene dichloride" in a cargo tank, which is one package. The material is not in a mixture or solution.

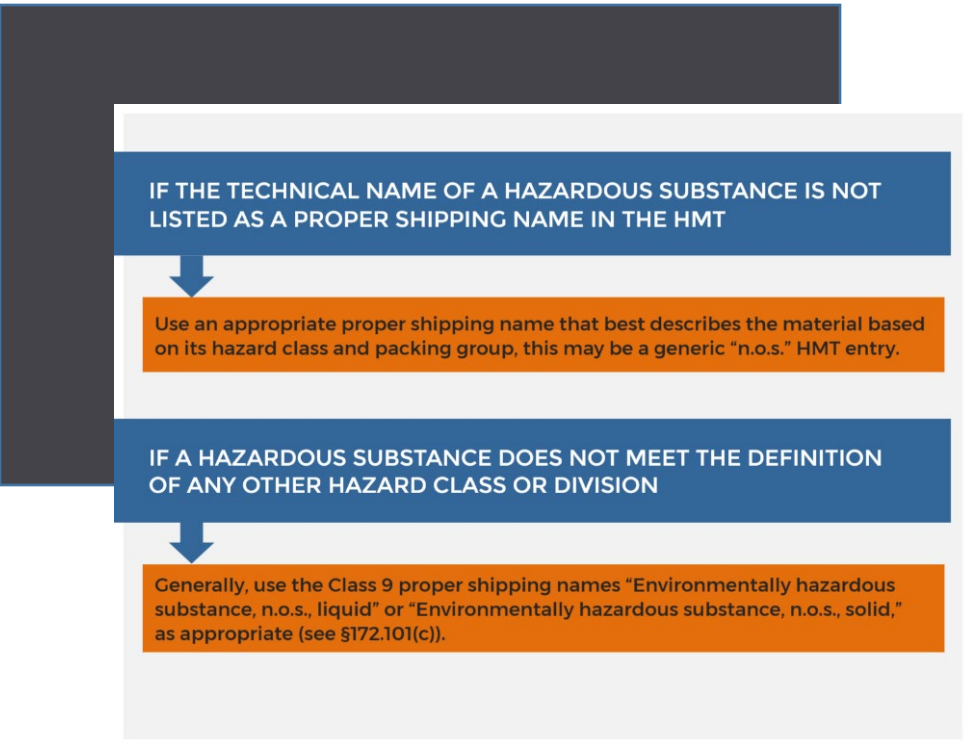
Step 3: Locate the name "Ethylene dichloride" in the left-hand column of Table I - Appendix A. Follow across the page to the far right column, titled Reportable Quantity. Reportable quantities are shown in pounds and kilograms. The RQ for Ethylene dichloride is 100 pounds or 45.4 kilograms per package.

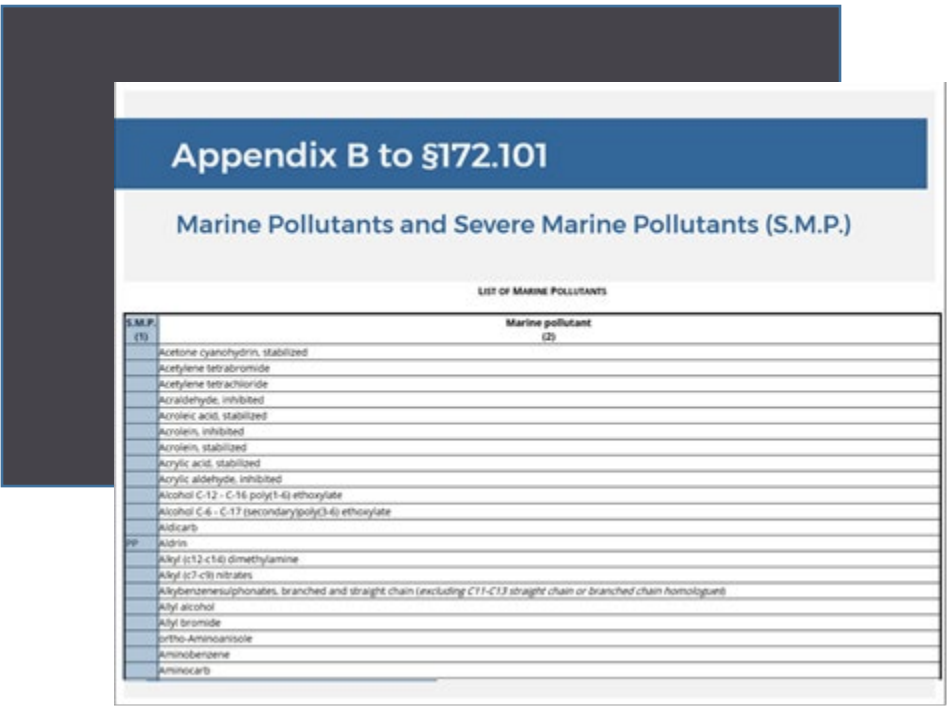
TABLE 1 TO APPENDIX A—HAZARDOUS SUBSTANCES OTHER THAN RADIONUCLIDES—Continued

Hazardous substance	Reportable quantity (RQ) pounds (kilograms)
Ethylenebisdithiocarbamic acid, salts & esters	5000 (2270)
Ethylenediamine	5000 (2270)
Ethylenediamine-tetraacetic acid (EDTA)	5000 (2270)
Ethylene dibromide	1 (0.454)
Ethylene dichloride	100 (45.4)
Ethylene glycol	5000 (2270)
Ethylene glycol monoethyl ether	1000 (454)
Ethylene oxide	10 (4.54)

Step 4: Once you determine it is listed in Table 1 to Appendix A, you also need to determine if the amount of material equals or exceeds the RQ for "Ethylene dichloride."

Answer: In this instance, the amount of 5,500 pounds exceeds the RQ limit of more than 100 pounds in one package; therefore, "Ethylene dicholoride" is a hazardous substance regulated for transportation.

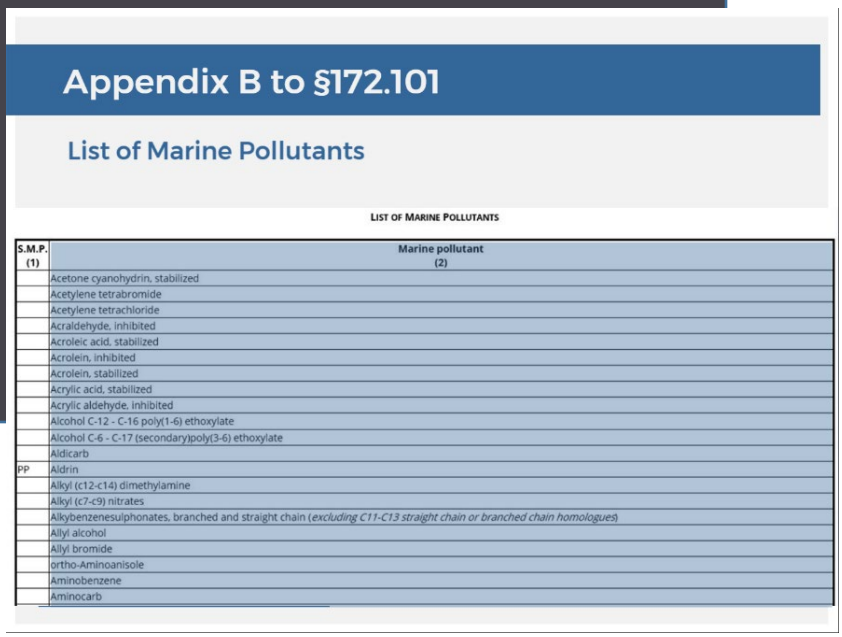




NARRATION:

In some instances, the **technical name** of a hazardous substance is not listed as a proper shipping name in the Hazardous Materials Table.
In that case, use an **appropriate proper shipping name** that best describes the material based on its hazard class and packing group, this may be a generic "n.o.s." HMT entry. If a hazardous substance does not meet the definition of any other hazard class or division then, generally, use the **Class 9 proper shipping names,** "Environmentally hazardous substance, n.o.s., liquid" or "Environmentally hazardous substance, n.o.s., solid," as appropriate.

Appendix B to §172.101 - List of Marine Pollutants contains two columns.
The **first column** identifies whether a material is a **severe** marine pollutant.
If the letters **"PP"** appear in this column for a material, the material is a severe marine pollutant, otherwise it is not.

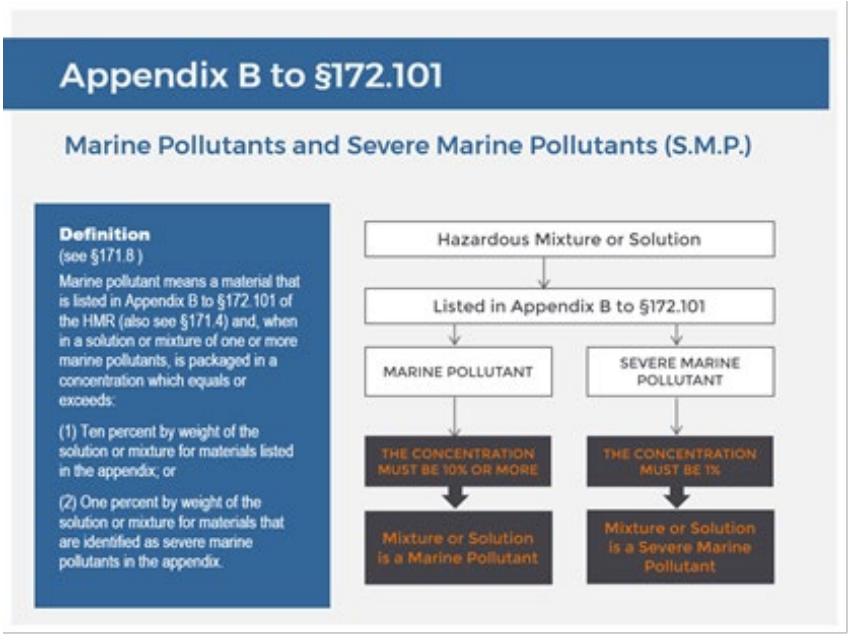


Appendix B to §172.101

List of Marine Pollutants

LIST OF MARINE POLLUTANTS

S.M.P. (1)	Marine pollutant (2)
	Acetone cyanohydrin, stabilized
	Acetylene tetrabromide
	Acetylene tetrachloride
	Acraldehyde, inhibited
	Acroleic acid, stabilized
	Acrolein, inhibited
	Acrolein, stabilized
	Acrylic acid, stabilized
	Acrylic aldehyde, inhibited
	Alcohol C-12 - C-16 poly(1-6) ethoxylate
	Alcohol C-6 - C-17 (secondary)poly(3-6) ethoxylate
	Aldicarb
PP	Aldrin
	Alkyl (c12-c14) dimethylamine
	Alkyl (c7-c9) nitrates
	Alkybenzenesulphonates, branched and straight chain (*excluding C11-C13 straight chain or branched chain homologues*)
	Allyl alcohol
	Allyl bromide
	ortho-Aminoanisole
	Aminobenzene
	Aminocarb



Appendix B to §172.101

Marine Pollutants and Severe Marine Pollutants (S.M.P.)

Definition
(see §171.8)

Marine pollutant means a material that is listed in Appendix B to §172.101 of the HMR (also see §171.4) and, when in a solution or mixture of one or more marine pollutants, is packaged in a concentration which equals or exceeds:

(1) Ten percent by weight of the solution or mixture for materials listed in the appendix; or

(2) One percent by weight of the solution or mixture for materials that are identified as severe marine pollutants in the appendix.

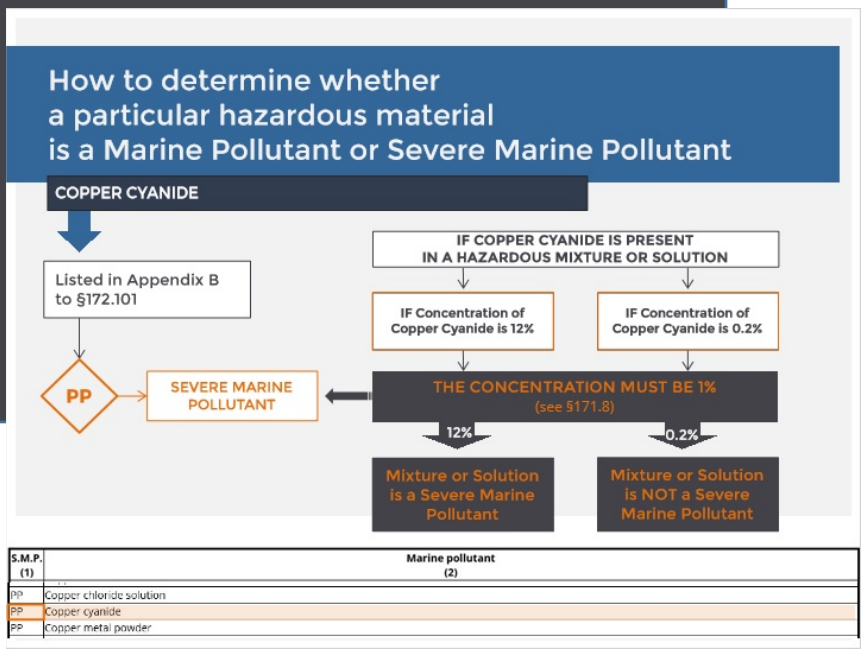
NARRATION:

The **second column** "Marine Pollutant" lists the marine pollutants.

Appendix B lists potential marine pollutants as defined in §171.8 of the Hazardous Materials Regulations.

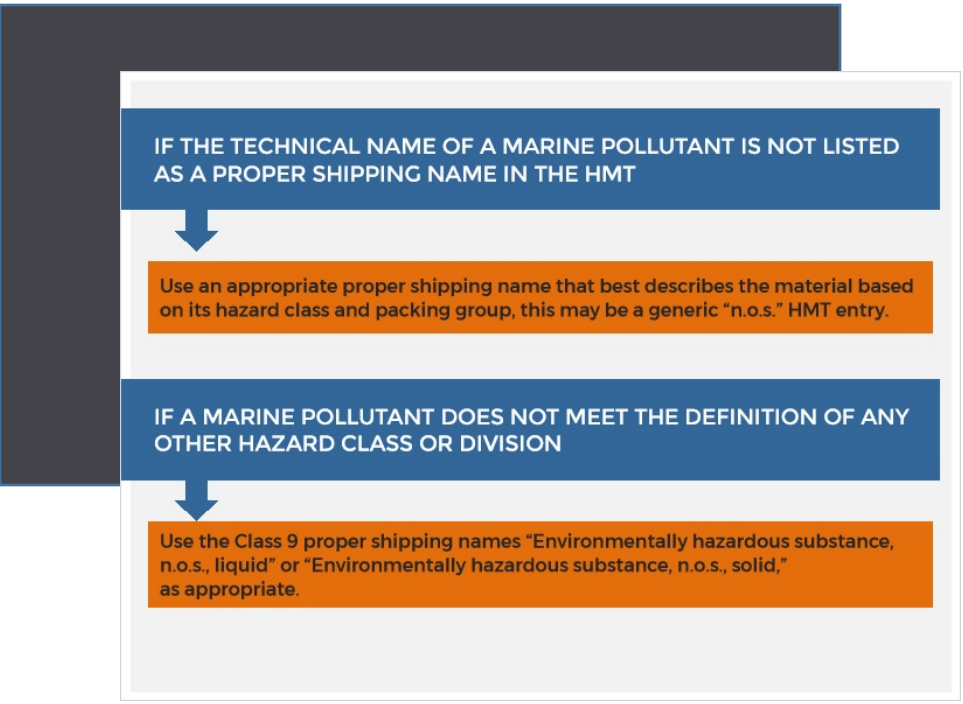
The designation between marine pollutant and severe marine pollutant is significant when the material is in a **mixture or solution**.

For mixtures and solutions, a marine pollutant must be in a concentration of **10% or more** for the mixture or solution to meet the definition of marine pollutant.
For severe marine pollutant, this concentration threshold is 1% concentration.



NARRATION:

Let's determine whether Copper Cyanide is a **Marine Pollutant or Severe Marine Pollutant.**
It is listed in Appendix B to the Hazardous Materials Table, and the letters **"PP"** are present in column 1, which means that Copper Cyanide is a severe marine pollutant.
Now, let's review the appropriate **steps** if Copper Cyanide is present in a Hazardous Mixture or Solution.
Depending on whether its concentration in a mixture or solution is **at least 1%**, a mixture or solution will be designated a severe marine pollutant.
For example,
if the concentration of copper cyanide in a mixture or solution is 12%, then the mixture or solution is a severe marine pollutant because it **exceeds** the 1% concentration amount designated in the definition (see §171.8).
If the concentration of copper cyanide in a mixture or solution is 0.2%, then the mixture or solution is not a severe marine pollutant because it **does not exceed or equal** the 1% concentration



NARRATION:

In some instances, the **technical name** of a marine pollutant is not listed as a proper shipping name in the Hazardous Materials Table.
In that case, use an **appropriate proper shipping name** that best describes the material based on its hazard class and packing group, this may be a generic "n.o.s." HMT entry.

If a **marine pollutant** does not meet the definition of any other hazard class or division, then use the Class 9 proper shipping names, "Environmentally hazardous substance, n.o.s., liquid" or "Environmentally hazardous substance, n.o.s., solid," as appropriate.