



# How to Use the Hazardous Materials Regulations





# Agenda

- **Define** Hazardous Material
- **Determine** Applicability
- **Demonstrate** use of the HMR Table
- **Demonstrate** the use of Special Provisions
- **Demonstrate** packaging selection
- **Demonstrate** use of Appendix A & B





# What is HAZMAT?

Hazardous material means a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in **commerce**, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of this subchapter.





# Who does this apply to?

The Secretary is authorized to apply these regulations to persons who:

- ✓ Transport
- ✓ Ship
- ✓ Manufacture/Maintain HAZMAT packagings
- ✓ Mark, Label, Placard and prepare Shipping Documents

...in *commerce*.





# HMR General Areas

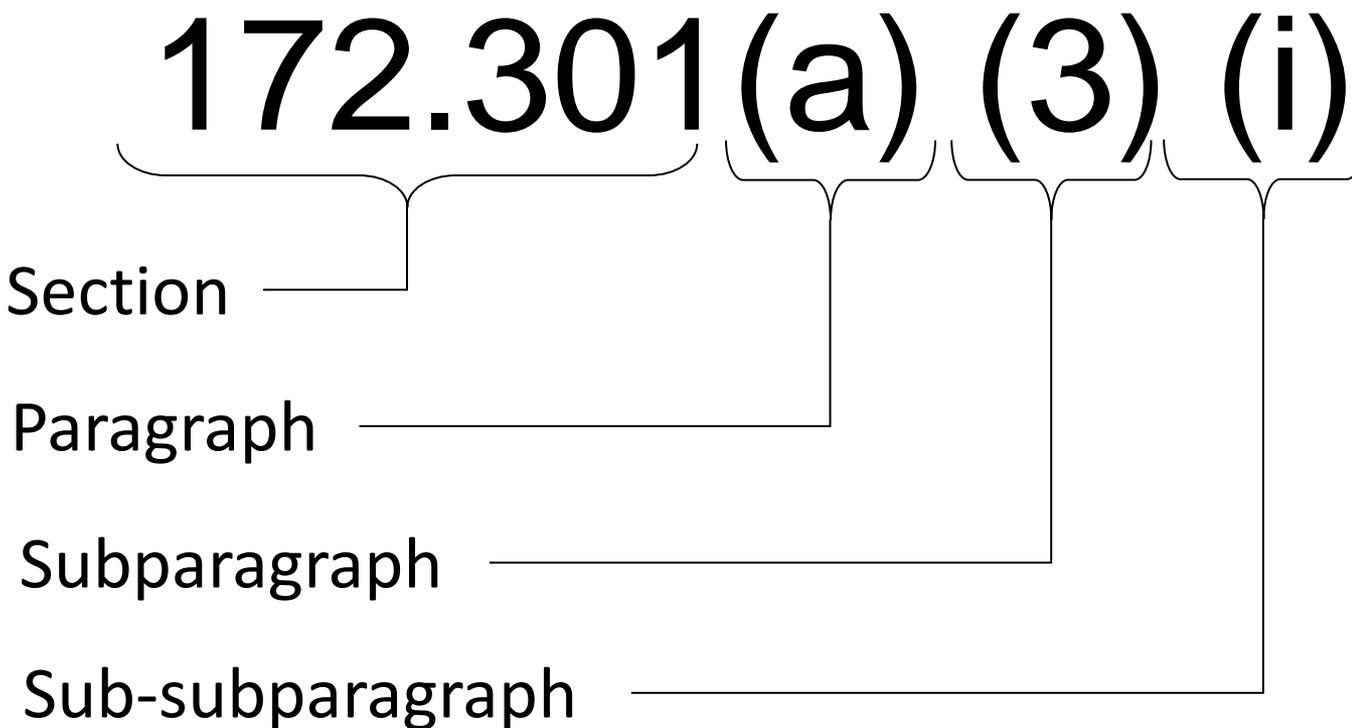
The HMR is divided into four general areas:

1. Identification and Classification
2. Hazard Communication
3. Packaging Requirements
4. Operational Rules





# Structure of the HMR





# Rules of Construction §171.9

- Singular words include the plural and plural words include the singular
- Masculine words include the feminine
- “Must” and “shall” mean required
- “Should” means recommended, but not required
- “May” means permitted, but not required
- “No person may” means no person is required, authorized, or permitted to...
- “Includes” means includes, but not limited to





# Hazardous Materials Table

Symbols (1)	Hazardous materials descriptions and proper shipping names (2)	Hazard class or Division (3)	Identification Numbers (4)	PG (5)	Label Codes (6)	Special provisions (§ 172.102) (7)	(8)			(9)		(10) Vessel stowage	
							Exceptions (8A)	Non-bulk (8B)	Bulk (8C)	Quantity limitations (see §§ 173.27 and 175.75)		Location (10A)	Other (10B)
										Passenger aircraft/rail (9A)	Cargo aircraft only (9B)		
	<i>Accellerene, seep-Nitrosodimethylaniline</i>												
	<i>Accumulators, electric, seeBatteries, wetetc</i>												
	<i>Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas), seeArticles pressurized, pneumaticorhydraulic (containing non-flamable gas)</i>												
	Acetal	3	UN1088	II	3	IB2, T4, TP1	150	202	242	5 L	60 L	E	
	Acetaldehyde	3	UN1089	I	3	A3, 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





# **BEFORE** the Table: Preamble

## **§ 172.101 Purpose and use of hazardous materials table.**

(a) The Hazardous Materials Table (Table) in this section designates the materials listed therein as hazardous materials for the purpose of transportation of those materials. For each listed material, the Table identifies the hazard class or specifies that the material is forbidden in transportation, and gives the proper shipping name or directs the user to the preferred proper shipping name. In addition, the Table specifies or references requirements in this subchapter pertaining to labeling, packaging, quantity limits aboard aircraft and stowage of hazardous materials aboard vessels.





# Column 1

S  
y  
m  
b  
o  
l  
s

+	Affixes Proper Shipping Name, Hazard Class & Packing Group (Pure Materials Only)
A	Air Transportation
D	Domestic Transportation
I	International Transportation
W	Vessel (Water) Transportation
G	Generic & Hazard Class, n.o.s. PSN Requiring Constituent Identification





# Column 2

## Hazardous Materials Descriptions and Proper Shipping Names

- Alphabetical listing
- Proper shipping names
  - Roman type
  - Singular or plural
- Words in *italics* are not part of the proper shipping name

Hazardous materials descriptions and proper shipping names
(2)
<i>Accellerene</i> , seep-Nitrosodimethylaniline
<i>Accumulators, electric</i> , seeBatteries, wetetc
<i>Accumulators, pressurized, pneumatic or hydraulic (containing non-flamable gas)</i> , seeArticles pressurized, pneumaticorhydraulic (containing non-flamable gas)
Acetal
Acetaldehyde
Acetaldehyde ammonia
Acetaldehyde oxime
Acetic acid, glacialorAcetic acid solution,with more than 80 percent acid, by mass
Acetic acid solution,not less than 50 percent but not more than 80 percent acid, by mass
Acetic acid solution,with more than 10 percent and less than 50 percent acid, by mass





# Column 2 Examples

- Proper Shipping Name (PSN)
- “*see*” in italics
- Qualifying words in italics

Hazardous materials descriptions and proper shipping names
(2)
<i>Accellerene, see Nitrosodimethylaniline</i>
<i>Accumulators, electric, see Batteries, wet etc</i>
<i>Accumulators, pressurized, pneumatic or hydraulic (containing non-flammable gas), see Articles pressurized, pneumatic or hydraulic (containing non-flammable gas)</i>
Acetal
Acetaldehyde
Acetaldehyde ammonia
Acetaldehyde oxime
<i>Acetic acid, glacial or Acetic acid solution, with more than 80 percent acid, by mass</i>
<i>Acetic acid solution, not less than 50 percent but not more than 80 percent acid, by mass</i>
<i>Acetic acid solution, with more than 10 percent and less than 50 percent acid, by mass</i>

§ 172.101(c)





## Hazard Class or Division

# Column 3

- A material for which the entry in this column is “**Forbidden**” may not be offered for transportation or transported. This prohibition does not apply if the material is diluted, stabilized or incorporated in a device and it is classed in accordance with the definitions of hazardous materials contained in part 173 of this subchapter.
  
- A basic description of each hazard class can be found in § 173.2
  
- **Examples:**
  - 1.2 Explosives (with a projection hazard)
  - 2.3 Poisonous gas
  - 3 Flammable and combustible liquid
  - 4.1 Flammable Solid
  - 7 Radioactive material





## Identification Numbers

# Column 4

- Identification number is assigned to each proper shipping name
  
- “UN” - United Nations
  - Considered appropriate for domestic and international transportation
  
- “NA” – North America
  - Domestic transportation
  - Transportation To and From Canada Only





# Column 5

PG

**Specifies one or more packing groups assigned to a material**

<b>Packing Group I</b>	<b>PG I</b>	<b>Great Danger</b>
<b>Packing Group II</b>	<b>PG II</b>	<b>Medium Danger</b>
<b>Packing Group III</b>	<b>PG III</b>	<b>Minor Danger</b>





# Assigning Packing Groups

Materials without Packing Group assignments:

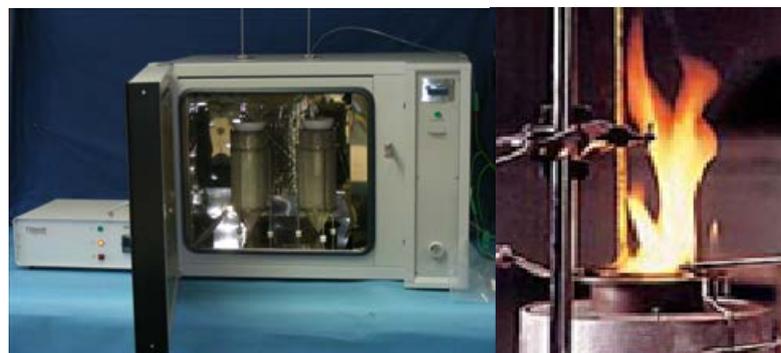
- Class 2
- Class 7
- Class 6.2
- ORM-D





# Determining Packing Groups

- Flammability (Flash Point)
- Reactivity (SADT, H<sub>2</sub>O, O<sub>2</sub>)
- Toxicity (LD 50/LC 50)
- Corrosivity (Time/Damage)





# Column 6

## Label Codes



- Specifies codes which represent hazard warning labels
  - See “Label Substitution Table” in §172.101(g)
- If more than one code is present:
  - The first indicate the primary hazard
  - Additional codes indicate subsidiary hazards





# Column 7

## Special Provisions

- Specifies codes for special provisions –
- Code descriptions
  - Numbers Only = All Applications
  - A = Air Transport Only
  - B = Bulk Transport Only
  - H = Highway Transport Only
  - N = Non-Bulk Transport Only
  - R = Rail Transport Only
  - T = IM Tanks Only
  - W = Water Transport Only

Special Provision (§172.102) (7)
N86, N88
1, B9, B14, B30, B42, B77, T22, TP2, TP7, TP13, TP38, TP44
24, 149, B1, IB2, T4, TP1
A3, A6, IB1, N34, T7, TP2, TP13





# Example Special Provision Codes

- **1** Poison by inhalation Hazard Zone A
- **A2** Single Packaging(s) not permitted on passenger aircraft
- **B25** Package must be made of monel or nickel
- **N41** Metal construction not allowed to contact materials

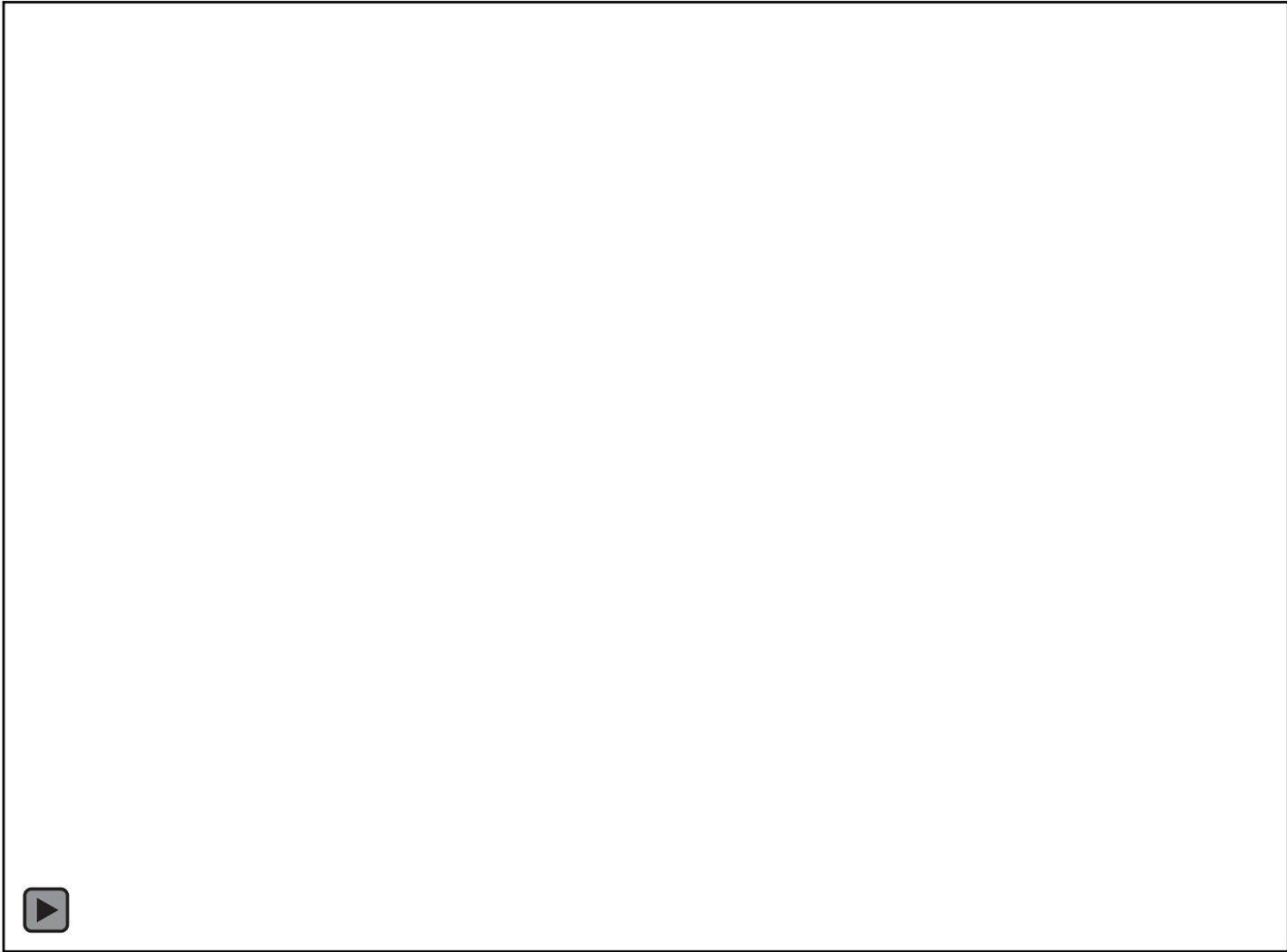




# Example Special Provision Codes Cont...

- **A1** Single packages permitted on passenger aircraft
- **B9** Bottom openings not Authorized
- **N33** Aluminum drums not authorized
- **24** Alcoholic Beverages Greater than 70% by volume







# Column 8

Packaging (173.***)		
Exceptions (8A)	Non-Bulk (8B)	Bulk (8C)

## ▪ Identifies the applicable packaging reference:

- Column **8A** - Packaging Exceptions (limited quantities)
- Column **8B** - Non-Bulk Packaging requirements
- Column **8C** - Bulk Packaging requirements

**\*\*\*Note\*\*\*** If “None” listed, you can not use that method





# Bulk vs. Non-Bulk

	<b>Bulk</b> Mass or Capacity <b><u>GREATER</u></b> than	<b>Non-Bulk</b> Mass or Capacity <b><u>LESS</u></b> than
Solid	400 kg (882 lbs)	400 kg (882 lbs)
Liquid	450 L (119 Gal)	450 L (119 Gal)
Gas	Water capacity greater than 454 kg (1000 lbs) as a receptacle for gas	Water capacity less than 454 kg (1000 lbs) as a receptacle for gas





# Column 8

Hazardous materials descriptions and proper shipping names (2)	Hazard class or Division (3)	Identification Numbers (4)	PG (5)	Label Codes (6)	Special provision (§ 172.102) (7)	(8)		
						Exceptions (8A)	Non-bulk (8B)	Bulk (8C)
Chlorite solution	8	UN1908	II	8	A3, A6 A7, B2 IB2, N34 T7, TP2 TP2	154	02	242

## §173.154 Exceptions for Class 8 (corrosive materials)

### Limited Quantity (LTD QTY)

**PG II:** 1.0 L Liquids / 1.0 kg Solids (net)

**PG III:** 5.0 L Liquids / 5 kg Solids (nets)

### Class 8 PG II & III LTD QTY:

- Excepted from labeling, placarding and shipping papers
- Excepted from Performance Oriented Packaging
- Handling package can weigh up to 30 kg (66 lbs)





# Column 8

Hazardous materials descriptions and proper shipping names (2)	Hazard class or Division (3)	Identification Numbers (4)	PG (5)	Label Codes (6)	Special provisions (§ 172.102) (7)	(8)		
						Packaging (§ 173.***)		
						Exception (8A)	Non-bulk (8B)	Bulk (8C)
Chlorite solution	8	UN1908	II	8	A3, A6, A7, B2, IB2, N34, T7, TP2, TP24	154	202	242

**§173.202 Non-bulk packaging for liquid hazardous materials in Packing Group II.**





Outer p  
 Steel d  
 Alumin  
 Metal d  
 1N2  
 Plywood  
 Fiber d  
 Plastic

enger  
 ngs are  
 inum: 1N1

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
(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)
Chlorite solution		8 UN1908		II 8	A3, A6, A7, B2, IB2, N34, T7, TP2, TP24	154	202	242

**Inner packagings:**

Wooden barrel: 2C2  
 Steel jerrican: 3A1 or 3A2

Glass or earthenware

Fiber drum: 1G (with liner)  
 Wooden barrel: 2C1

**N34: Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.**

Fiberboard box: 4G  
 Expanded plastic box: 4H1  
 Solid plastic box: 4H2  
 Metal box other than steel or aluminum: 4N

OND2 or 6HG2  
 Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1





# Column 8

Hazardous materials descriptions and proper shipping names (2)	Hazard class or Division (3)	Identification Numbers (4)	PG (5)	Label Codes (6)	Special provisions (§ 172.102) (7)	(8)		
						Packaging (§ 173.***)		
						Exceptions (8A)	Non bulk (8B)	Bulk (8C)
Chlorite solution	8	UN1908	II	8	A3, A6, A7, B2, IB2, N34, T7, TP2, TP24	154	202	242

**§173.242 Bulk packagings for certain medium hazard liquids and solids, including solids with dual hazards**





# Column 8

**§173.242 Bulk packagings for certain medium hazard liquids and solids, including solids with dual hazards**



Bottom Openings



Pressure Relief  
Devices

**§ 172.101(i)(3)**





# Column 9



§ 172.101(j)





# Column 9

(9)	
Quantity limitations (see §§ 173.27 and 175.75)	
Passenger aircraft/rail	Cargo aircraft only
(9A)	(9B)
5 L	60 L
Forbidden	30 L
200 kg	200 kg

- “Forbidden” means the material may not be offered for transportation or transported in the applicable mode of transport
- The quantity limitation is “net” except where otherwise specified such as for “Consumer commodity” which specifies “30 kg gross.”
- When articles or devices are specifically listed by name, the net quantity limitation applies to the entire article or device (less packaging and packaging materials) rather than only to its hazardous components
- A package offered or intended for transportation by aircraft and which is filled with a material forbidden on passenger-carrying aircraft but permitted on cargo aircraft only, or which exceeds the maximum net quantity authorized on passenger-carrying aircraft, shall be labeled with the **CARGO AIRCRAFT ONLY** label specified in § 172.448 of this part





# Column 10

## 10A

“Specifies the authorized stowage locations on board cargo and passenger vessels.”

- 10A Stowage Categories are found specifically in §172.101(k)

*EXAMPLE:*

- 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.



(10) Vessel stowage	
Location (10A)	Other (10B)
E	
E	
A	34





# Column 10

## 10B

- “Column 10B [Other provisions] specifies codes for stowage requirements for specific hazardous materials. Hazardous materials offered for transportation as limited quantities are allocated stowage category A and are not subject to the stowage codes assigned by column 10B. **The meaning of each code in Column 10B is set forth in § 176.84 of this subchapter”**

(10) Vessel stowage	
Location (10A)	Other (10B)
E	
E	
A	34

Code	Provisions
1	[Reserved]
2	Temperature controlled material.
3	Do not stow with high explosives.
4	Stow "Separated from" liquid organic materials.
5	Stow "Separated from" powdered metals and their compounds.
6	Emergency temperature material.
7	[Reserved]
8	Glass carboys not permitted on passenger vessels.
9	Glass carboys not permitted under deck.
10	Glass bottles not permitted under deck.
11	Keep away from heat and open flame.
12	Keep as cool as reasonably practicable.

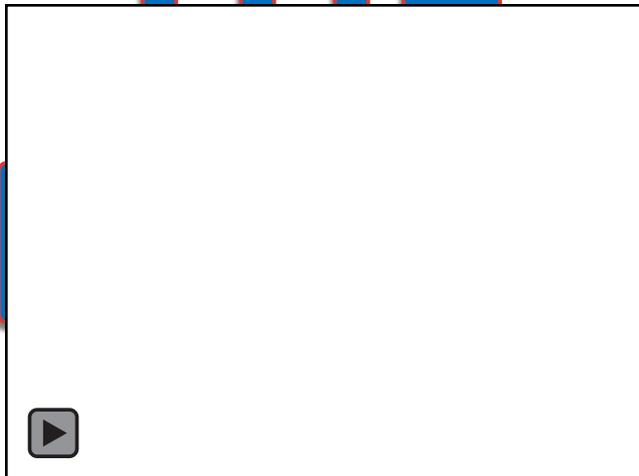




# THE

# APPLI

# ES!!





# Appendices



**Appendix A: Hazardous Substances**



**Appendix B: Marine Pollutants**





# HAZARDOUS SUBSTANCE

- **Listed in Appendix A**
- **Defined:**
  - Placed in transportation
  - Meets or exceeds RQ listed per/pkg
    - (package plus contents, gross)
    - *In pounds and KGs*
  - Once it becomes a HAZARDOUS SUBSTANCE now considered HAZMAT
  - Name of Substance with RQ listed with PSN





# MARINE POLLUTANT

- **Listed in Appendix B**
  - Marine Pollutants
    - 10% by volume
  - Severe Marine Pollutants (PP)
    - 1% by volume
    - If no other HAZMAT traits (Class 1-8)
    - *UN 3077 Environmentally hazardous substance, liquid/solid n.o.s, 9*





# Identify the Material

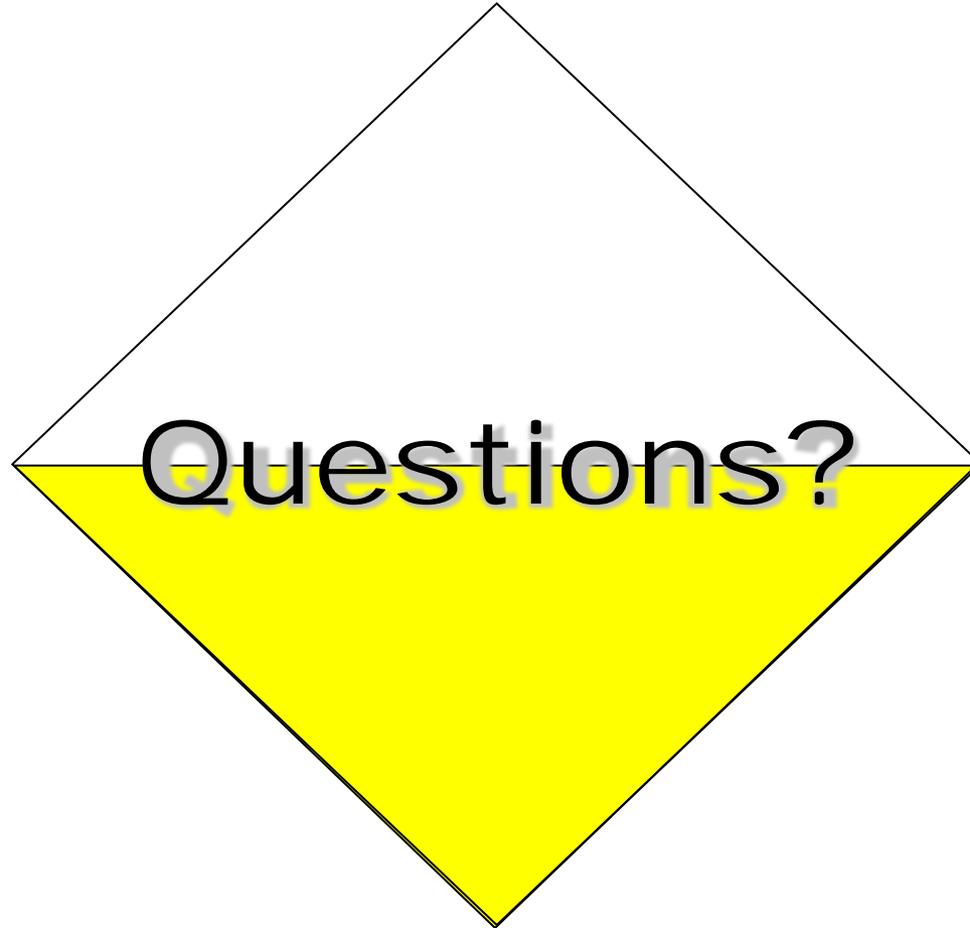
- Proper Shipping Name (**Col. 2**)
- Hazard Class or Division (**Col. 3**)
- Identification Number (**Col. 4**)
- Packing Group (**Col. 5**)(if appropriate)

**DON'T FORGET TO CHECK THE APPENDICES TO THE HMT (172.101)**

Appendix A – The hazardous material may also be a **hazardous substance**

Appendix B – The hazardous material may also be a **marine pollutant**







# Where to Find More Information...

**PHMSA**  
 Pipeline and Hazardous Materials  
 Safety Administration

U.S. Department of Transportation

Contact Us | FAQs | Site Map

PHMSA Home | Pipeline Safety | **Hazardous Materials Safety**

Go  Advanced Search

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**Safety Advisories**

- > [PHMSA Continues Push to Clarify & Update Hazmat Rules](#)
- > [2011 Hazmat Penalty Action Report](#)
- > [Hazmat Harmonization Rule on Air Packaging Issued](#)
- > [PHMSA seeks comment on transportation of lithium batteries](#)
- > [PHMSA Proposes Updating Hazmat Rules to Better Balance Safety Standards and Regulatory Requirements](#)

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**Regulations & Rulemakings**  
 PHMSA regulates and ensures the safe movement of hazardous materials.

**Data & Reports**  
 PHMSA tracks data on the frequency of failures, incidents and accidents.

**Permits & Approvals**





# Hazardous Material Info-Center

1-800-HMR-4922

(1-800-467-4922)

**E-mail: [infocntr@dot.gov](mailto:infocntr@dot.gov)**

**Hours of Operation: 9 am – 5 pm ET**



- Obtain answers to HMR questions
- Request copies of Federal Register, special permits or training materials
- Report HMR violations
- Fax on Demand





# Hazardous Material Safety Assistance Team

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