

How to Use the HMR



Jack Whitley

HMSAT, Western Region

3401 Centre Lake Dr.

Suite 550B

Ontario, CA 91761

Phone: 909-937-3279

Earl.whitley@dot.gov

Hazardous Material Safety Assistance Team



Primary Goal of the Hazardous Materials Regulations (HMR)

Safety



Protecting the Public



Preparing Shipments for All Environments



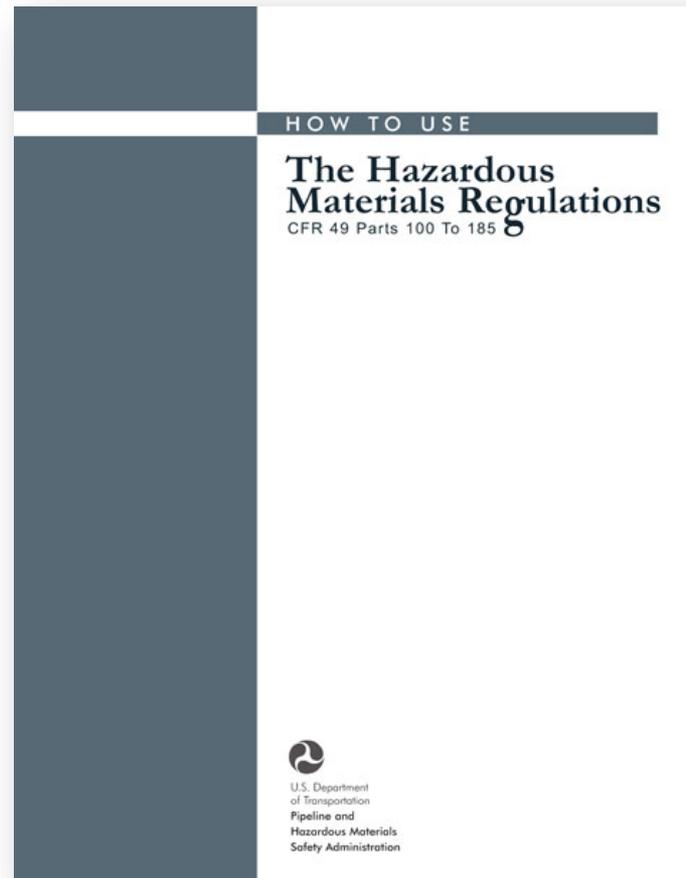
What If This Was Hazmat?



“Incidents Occur”



Reference Material



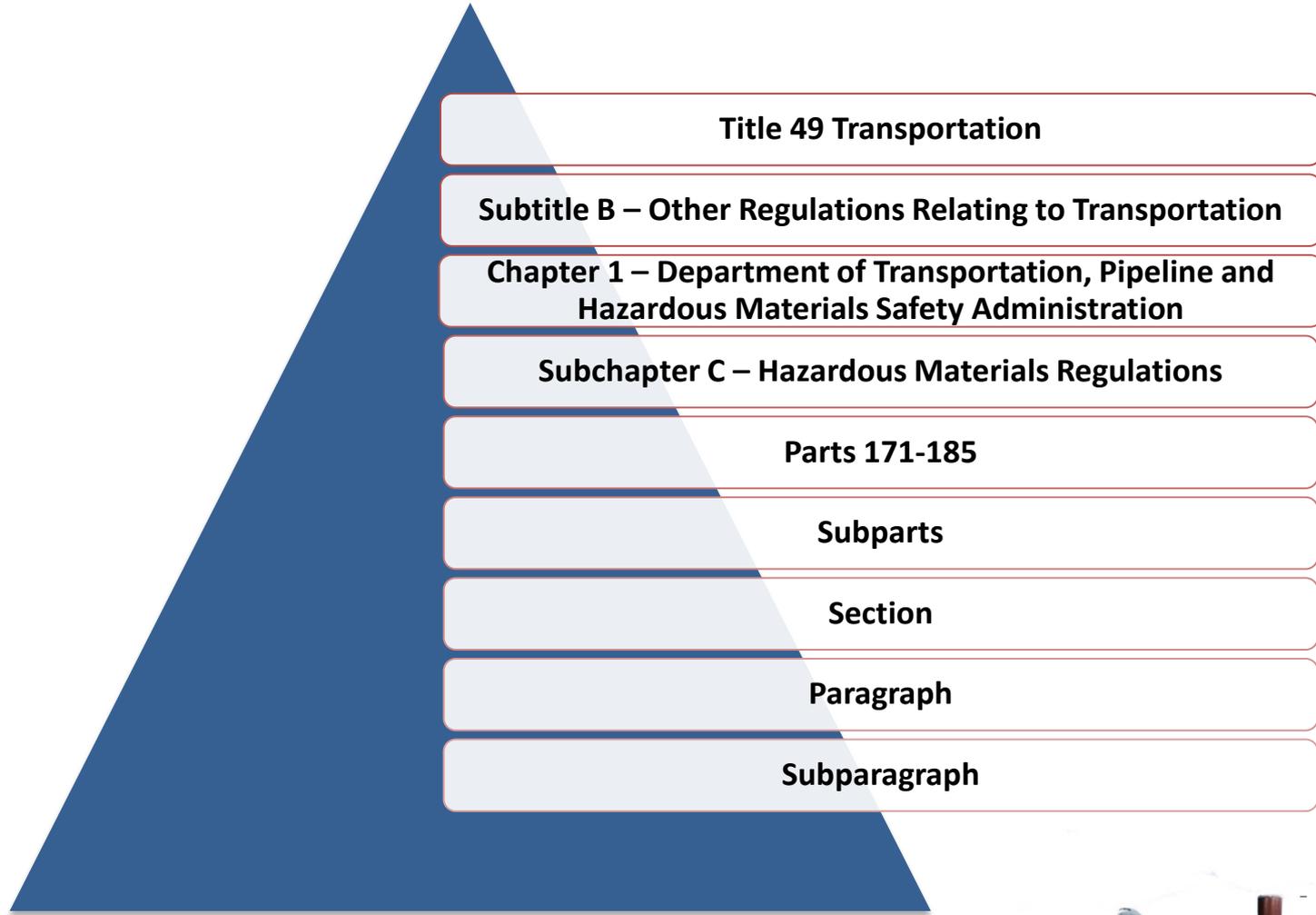
HMR General Areas

The HMR is divided into four general areas:

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



HMR Breakdown



Title 49 Transportation

Subtitle B – Other Regulations Relating to Transportation

**Chapter 1 – Department of Transportation, Pipeline and
Hazardous Materials Safety Administration**

Subchapter C – Hazardous Materials Regulations

Parts 171-185

Subparts

Section

Paragraph

Subparagraph



Structure of the HMR

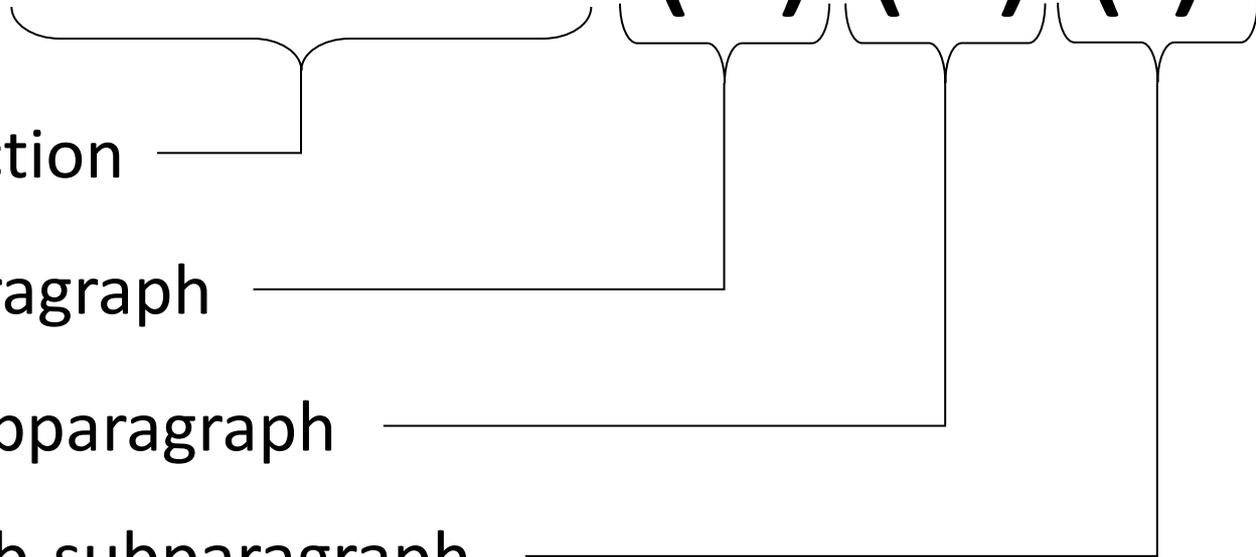
172.301 (a) (3) (i)

Section

Paragraph

Subparagraph

Sub-subparagraph



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



What is a HAZMAT?

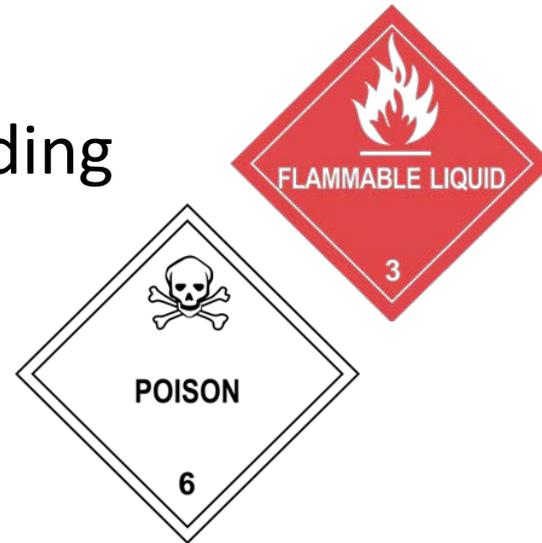
Hazardous material means a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation 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.

§ 171.8



Is it a HAZMAT?

- Listed in the HAZMAT Table
- Prior marking/labeling/placarding
- Safety Data Sheet (SDS)
- Testing



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**



The Hazardous Material Table

§172.101

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) Packaging (§173.***)			(9) Quantity Limitations	
							Exceptions (8A)	Non-bulk (8B)	Bulk (8C)	Passenger aircraft/rail (9A)	Cargo aircraft only (9B)
	Acrolein, stabilized	6.1	UN1092	I	6.1, 3	1, B9, B14, B30, B42, B77, T22, TP2, TP7, TP13, TP38, TP44	None	226	244	Forbidden	Forbidden
	Copper cyanide	6.1	UN1587	II	6.1	IB8, IP2, IP4, T3, TP33	153	204	242	25kg	100kg
G	Flammable liquid, n.o.s.	3	UN1993	I	3	T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3	150	201	243	1L	30L
				II	3		150	202	242	5L	60L
				III	3	T4, TP1, TP29	150	203	242	60L	220L
	Phosphoric acid solution	8	UN1805	III	8	A7, IB3, N34, T4, TP1	154	203	241	5L	60L



Table Provisions (PREAMBLE)

- Preamble is the road map.
- Key references for each column listed.
- When all else fails go back!
- [49 CFR 172.101 Subpart B](#)



Symbols

Column 1

+ → Affixes Proper Shipping Name, Hazard Class & Packing Group (Pure Materials Only) without regard to whether the material meets the definition of that class, packing group or any other hazard class definition

A → Air Transportation

W → Vessel (Water) Transportation

Regulated when transported by

D → Domestic Transportation

I → International Transportation

For “proper shipping names”

G → Generic & Hazard Class, n.o.s. PSN Requiring Constituent Identification

§ 172.101(b)

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Column 2

Hazardous Materials Descriptions and Proper Shipping Names

- Alphabetical listing of hazardous materials descriptions and proper shipping names
- Proper shipping names
 - Roman type
 - Singular or plural
- Words in *italic* are not part of the proper shipping name

§ 172.101(c)

Punctuation marks and words in italics are not part of the proper shipping name, but may be used in addition to the proper shipping name.



Examples of PSN

- *Anhydrous ammonia, see*

Ammonia, Anhydrous

- **Acetone**

- *Ammunition, rocket see*

Warheads, rocket etc.



More Examples of PSN

- **Hydrogen, compressed**
- **Hydrogen cyanide, stabilized**
with less than 3 percent water
- *Hydroxyl amine iodide* – “Forbidden”



Hazard Class or Division

Column 3

- Designation of hazard class or division or “Forbidden”
- 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

§ 172.101(d)



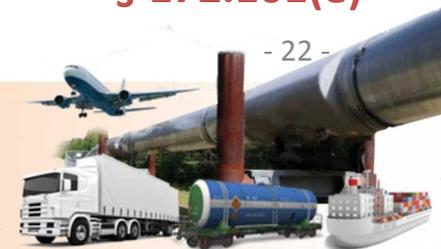
Identification Numbers

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
- “ID” – International Civil Aviation Organization (ICAO)

§ 172.101(e)

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Assigning Packing Groups

- Class 2 (gases)
- Class 7 (radioactive)
- Class 6.2 (other regulated medical wastes)
- ORM-D (other regulated material – D)

More than one PG assigned?

Flash Point, Reactivity



Determining Packing Group?

- **49 CFR 173 Subpart D**
 - Flammability (Flash Point)
 - Reactivity (SADT, H₂O, O₂)
 - Toxicity (LD 50/LC 50)
 - Corrosiveness (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 indicates the primary hazard
 - Additional codes indicates subsidiary hazards

§ 172.101(g)



Column 7

Special Provisions

- Specifies codes for special provisions – see §172.102 for the meaning of the 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

§ 172.101(h) 172.102



Example Special Provision Codes

- **A2** Single packagings are not permitted on aircraft
- **B25** Package must be made from monel or nickel
- **N41** Metal construction not allowed to contact materials
- **1** Poison by inhalation Hazard Zone A



Example Special Provision Codes Continued

- **A1** Single packages are not permitted on passenger aircraft
- **B9** Bottom outlets are not authorized.
- **N33** Aluminum drums are not authorized.
- **24** Alcoholic Beverages Greater than 70%
By volume (Dad's Moonshine shipments)
must be transported as PGII



Exceptions

Exceptions. Column 8A contains exceptions from some of the requirements of this subchapter. The referenced exceptions are in addition to those specified in subpart A of part 173 and elsewhere in this subchapter.

A “None” in this column means no packaging exceptions are authorized, except as may be provided by special provisions in Column 7. “None” does not apply to the small, excepted or de minimis quantities exceptions found in §§ 173.4, 173.4a, or 173.4b

- Exceptions are for small amounts of hazardous materials, exceptions and quantity limitations vary based on hazards.



Non-bulk

Non-bulk packaging means a packaging which has:

- (1) A maximum capacity of 450 L (119 gallons) or less as a receptacle for a liquid;
- (2) A maximum net mass of 400 kg (882 pounds) or less and a maximum capacity of 450 L (119 gallons) or less as a receptacle for a solid;
- (3) A water capacity of 454 kg (1000 pounds) or less as a receptacle for a gas as defined in §173.115 of this subchapter; or
- (4) Regardless of the definition of bulk packaging, a maximum net mass of 400 kg (882 pounds) or less for a bag or a box conforming to the applicable requirements for specification packagings, including the maximum net mass limitations, provided in subpart L of part 178 of this subchapter.

§ 171.8



Bulk

Bulk packaging means a packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment. A Large Packaging in which hazardous materials are loaded with an intermediate form of containment, such as one or more articles or inner packagings, is also a bulk packaging. Additionally, a bulk packaging has:

- (1) A maximum capacity greater than 450 L (119 gallons) as a receptacle for a liquid;
- (2) A maximum net mass greater than 400 kg (882 pounds) and a maximum capacity greater than 450 L (119 gallons) as a receptacle for a solid; or
- (3) A water capacity greater than 454 kg (1000 pounds) as a receptacle for a gas as defined in §173.115 of this subchapter.

§ 171.8



Example for “ACETAL”

- **Exception - 150**
 - LTD QTY, Consumer Commodities, limitations per package/overpack
- **Non Bulk - 202**
 - Outer package, Inner package
- **Bulk - 242**
 - Rail cars, Cargo tanks, Portable tanks and IBCs to be used



Column 9

Quantity Limitations	
Passenger aircraft/rail (9A)	Cargo aircraft only (9B)

- Columns specify the maximum quantities (kgs) per package
- “Forbidden”
- Quantity limitation is “net” unless otherwise specified
- If “Forbidden” on passenger-carrying aircraft, but permitted on cargo aircraft, it must be labeled with the CARGO AIRCRAFT ONLY label (§172.448)



§ 172.101(j)



Column 10

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

- Column 10A specifies authorized stowage locations on board cargo and passenger vessels
- Column 10B specifies codes for stowage requirements – see §176.84 for code meanings

§ 172.101(k)



Step-wise Compliance Process

§172.101 Hazardous Materials Table													
(1) Symbols	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class or Division	(4) Identification Numbers	(5) PG	(6) Label Codes	(7) Special provisions	(8) Packaging (§173.***)			(9) Quantity limitations		(10) Vessel stowage	
							(8A) Exceptions	(8B) Non-bulk	(8C) Bulk	(9A) Passenger aircraft/rail	(9B) Cargo aircraft only	(10A) Location	(10B) Other
	Sodium peroxide.....	5.1	UN1504	I	5.1.....	A20, N34.....	None....	211....	None...	Forbidden	15 kg....	B	13, 75, 106
	Sodium peroxoborate, anhydrous	5.1	UN3247	II	5.1.....	152....	212....	240....	5 kg.....	25 kg....	A	13, 25, 106
	Sodium Persulfate.....	5.1	UN1505	III	5.1.....	A1.....	152....	213....	240....	25 kg.....	100 kg...	A

STEP	TASK	HMT COLUMN	STEP	TASK	HMT COLUMN	
1	Determine proper shipping name*	2	4	Determine labels	6	
	Hazard class or division	3		5	Determine air/rail quantity limits	9A & 9B
	Identification number	4			6	Determine water requirements
	Packing group (PG)	5		*Note: Check the Appendices. The material may also be a hazardous substance (Appendix A) or a marine pollutant (Appendix B).		
2	Determine symbol	1				
3	Determine Packaging	8				
	Exceptions	8A				
	Non-Bulk Packaging	8B				
	Bulk Packaging	8C				
Determine if any special provisions for the material apply		7				



Step 1: 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**



HAZARDOUS SUBSTANCE

- **Listed in Appendix A**
- **Defined:**
 - Placed in transportation
 - Meets or exceeds RQ listed per/pkg
 - *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*



Step 2: Check Symbols

- Determine if restrictions (+, A, D, G, I or W) apply **(Col. 1)**

Step 3: Determine Packaging

- Check special provisions **(Col. 7)**
- Determine authorized packaging **(Col. 8A, 8B, 8C)**



Step 4: Label the Package

- Determine the required hazard warning label(s) (Col. 6)
- Furthermore:
 - Mark the package (§172.300)
 - Determine placarding requirements (§172.500)



Step 5: Check Air or Rail Limitations

- If transporting by air and/or rail, determine packaging limitations (**Col. 9A, 9B**)

Step 6: Check Water Limitations

- If transporting by water, determine vessel shipment requirements (**Col. 10A, 10B**)



Additional Requirements

- **Shipper's Certification**
- **Other hazard communication**
 - Shipping papers
 - Additional labeling
 - Emergency Response Information
 - Emergency Telephone Number



Got A
Question?



Where to Find More Information...

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Pipeline and Hazardous Materials
Safety Administration

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2016 EMERGENCY RESPONSE GUIDEBOOK
A guidebook intended for use by first responders during the initial phase of a transportation incident involving dangerous goods/hazardous materials

DOT announces release of new 2016 Emergency Response Guidebook

News & Updates

- U.S. Department of Transportation Announces [Flammable Liquid Unit Trains Response Curriculum](#)
- [HM-253 Reverse Logistics Final Rule - March 2016 \(PDF\)](#)
- [The Fixing America's Surface Transportation \(FAST\) Act](#)
- [Briefing Room](#)

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