



# Package Selection, Marking, and Labeling Requirements

**Presenter Name**

**Title, Region  
Field Operations**

**<http://phmsa.dot.gov/hazmat>**

**Month/Year**





# Objectives

- Identify Applicable Parts of Hazardous Materials Regulations (HMR)
- Describe United Nations (UN) Packaging Standards and Codes
- Determine Hazard Communication Marking and Labels





# HM215J & UN Harmonization Labels

Line



§172.446



No Line



Old



New  
§172.448

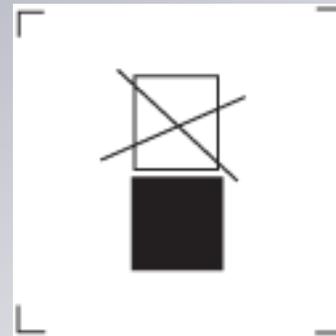
Text Changes



# HM215J & UN Harmonization Markings



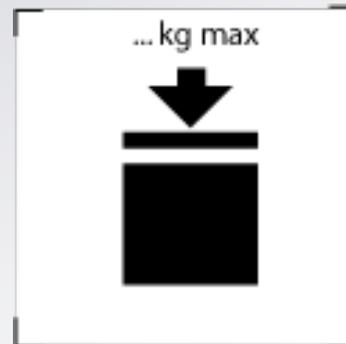
Marine Pollutant  
§172.322



Non-Stackable IBC  
§178.703



Excepted Quantities  
§172.448



Stackable IBC  
§178.703



# HMR 49 CFR

- **Part 172 –**  
Subparts B, D and E
- **Part 173**
- **Part 178 –**  
Subpart L and M





# Is The Material Hazardous?

- Check Table §172.101 (HMT)
- Identify the HM by Proper Shipping Name – Column 2

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	
							Excep- tions (8A)	Non- bulk (8B)	Bulk (8C)	Passenger aircraft/rail (9A)	Cargo air- craft only (9B)
	Acrolein, stabilized	6.1	UN1092	I	6.1, 3	1, B9, B14, B30, B42, B72, 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	None	204	242	25kg	100kg
G	Flammable liquid, n.o.s.	3	UN1993	I II III	3 3 3	T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29	150 150 150	201 202 203	243 242 242	1L 5L 60L	30L 60L 220L
	Phosphoric acid solution	8	UN1805	III	8	A7, IB3, N34, T4, TP1	154	203	241	5L	60L

**§172.101 Hazardous Materials Table Excerpts**



# Column 8 Packaging (173.\*\*\*)

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	
							Excep- tions (8A)	Non- bulk (8B)	Bulk (8C)	Passenger aircraft/rail (9A)	Cargo air- craft only (9B)
	Acrolein, stabilized	6.1	UN1092	I	6.1, 3	1, B9, B14, B30, B42, B72, 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	None	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, T4, TP1, TP29	150	201	243	1L	30L
				II	3		150	202	242	5L	60L
				III	3		150	203	242	60L	220L
	Phosphoric acid solution	8	UN1805	III	8	A7, IB3, N34, T4, TP1	154	203	241	5L	60L

## §172.101 Hazardous Materials Table Excerpts



# Non-Bulk Packagings for Liquid Hazardous Materials in Packing Group III (§173.203)

- Combination Packagings
- Single Packagings



**1A2 STEEL DRUM**

removable head  
used as combination packaging



**FIBERBOARD BOX**

used as combination packaging  
showing inner packagings



**1A1 STEEL DRUM**

non-removable head  
used as single packaging



## Other Requirements of §173.203

- Packaging Conforms to Subpart B of Part 173
- Packaging Meets Requirements of Part 178 at PG I, II or III level
- Special Provisions of Column 7, HMT are Met



# Column 7 Special Provisions (§172.102)

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, B72, 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	None	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, T4, TP1, TP29	150	201	243	1L	30L
				II	3		150	202	242	5L	60L
				III	3		150	203	242	60L	220L
	Phosphoric acid solution	8	UN1805	III	8	A7 IB3, N34 T4, TP1	154	203	241	5L	60L

**§172.101 Hazardous Materials Table Excerpts**



## Column 7 Special Provisions (§171.102)

- Identifies additional provisions for the specific hazardous material
  - “1” means poisonous by inhalation, Hazard Zone A
- May impose limitations or additional requirements on packaging
  - A7 requires steel packaging to be corrosion resistant when shipped by air
  - N34 requires aluminum constructed materials not in contact with the hazardous material



# Performance-Oriented Packaging



**1A2 STEEL DRUM**  
used as combination packaging



**1A1 STEEL DRUM**  
used as single packaging



# Required Tests for Non-Bulk Packagings and Packages

- **Drop Test – §178.603**
  - All packagings
- **Leakproofness Test – §178.604**
  - All packagings intended for liquids
- **Hydrostatic Test – §178.605**
  - Metal, plastic and composite intended for liquids
- **Stacking Test – §178.606**
  - All packaging other than bags
- **Vibration Standard – §178.608**
  - All packaging



# **Closure Requirements**

## **§173.22 (a)(4)**

DOT Specification or UN standard packaging must be closed in accordance with the instructions provided by the packaging manufacturer or subsequent distributor



# Manufactures Responsibility

§178.2(c) *paraphrased*

...the manufacturer...of that packaging must:

specifying the type(s) and dimensions of the closures, including gaskets and any other components needed to ensure that the packaging is capable of successfully passing the applicable performance tests.





## Manufactures Responsibility Continued

§178.2(c) *paraphrased*

This information must include any procedures to be followed, including closure instructions for inner packagings and receptacles, to effectively assemble and close the packaging for the purpose of preventing leakage in transportation. ***Closure instructions must provide for a consistent and repeatable means of closure that is sufficient to ensure the packaging is closed in the same manner as it was tested.***





# Closure Notifications

- Types of Notifications
  - Written
  - Embossed
  - Printed on the Package



## Closure Instructions

1. SEAL PAINT CANS:  
FOR GROUND SHIPMENTS ONLY, ATTACH 6 CAN CLIPS.  
FOR AIR OR GROUND SHIPMENTS, SEAL WITH LOCKING RING.  
(LOCKING RING REQUIRED FOR AIR SHIPMENTS)
2. IF SHIPPING 1 UNIT, SEAL 1 CAN AND ASSEMBLE SINGLE SHIPMENT CORRUGATED BOX.  
IF SHIPPING 2 UNITS, SEAL 2 CANS AND ASSEMBLE 2 PACK CORRUGATED BOX.  
IF SHIPPING 4 UNITS, SEAL 4 CANS AND ASSEMBLE 4 PACK CORRUGATED BOX.
3. PLACE EPS FOAM CAP INSERTS INTO BASE OF BOX.
4. PUT FILLED CAN/CANS IN EPS FOAM CAP INSERTS.
5. PLACE EPS FOAM CAP INSERTS ON TOP OF CAN/CANS.
6. TAPE BOX CLOSED WITH 3" REINFORCED GUMMED TAPE OR MINIMUM 2 MIL 2" CLEAR CARTON SEALING TAPE.



### ATTENTION

**To seal can:**  
Apply downward pressure to lid until seated completely into grooves on can.  
**Air:** Apply downward pressure to locking ring until contacting top of can.  
**Ground:** Lock clips into grooves on can in an evenly spaced pattern.

**Outer flaps meet. Use center seam tape pattern 2.5" min. overlap**

**SINGLE KIT CONTAINS:** ONE SINGLE SHIPMENT CARTON AND 2 EPS FOAM CAPS.

**2 PACK KIT CONTAINS:** ONE 2 PACK CARTON AND 4 EPS FOAM CAPS.

**4 PACK KIT CONTAINS:** ONE 4 PACK CARTON AND 8 EPS FOAM CAPS.

\*\*\*LPS WILL ASSUME RESPONSIBILITY FOR PACKAGE INTEGRITY AND COMPLIANCE WITH ICAO/IATA, IMO AND UN STANDARDS, "ONLY", IF ALL PACKAGE COMPONENTS ARE ASSEMBLED AND PURCHASED AS A SINGLE INTEGRATED UNIT.



# Written



**GREIF**

GREIF INDUSTRIAL PACKAGING & SERVICES LLC  
DOT REQUIRED NOTIFICATION STATEMENT  
INTERMEDIATE BULK CONTAINERS

The below listed statement is printed on the bottom of each packing list copy of the customer order that is shipped from Greif, Inc. Lavonia, Georgia Intermediate Bulk Container plant.

The recent g that manufa s requires writing of: ners in

1. A
2. P

**GREIF**

e empty

The followi regulatory requiremen.

that

UN IBC'S

- TOP OPENINGS IN GREIF UN-IBC'S MUST BE FITTED WITH 6" COVERS AND GASKETS SUPPLIED BY GREIF INC. 6" COVERS MUST BE TIGHTENED 1/2 TURN AFTER GASKET CONTACT WITH THE TOP OF THE BOTTLE AND TO AT LEAST 45 FT. LBS TORQUE. FITTINGS IN THE COVER MUST BE TIGHTENED TO A TORQUE OF 20 FT-LBS FOR 2"NPT FITTINGS AND 9 FT-LBS FOR 3/4" BUNGS, IF INSTALLED.



**TOP OPENINGS IN GREIF UN-IBC'S MUST BE FITTED WITH 6" COVERS AND GASKETS SUPPLIED BY GREIF INC. 6" COVERS MUST BE TIGHTENED 1/2 TURN AFTER GASKET CONTACT WITH THE TOP OF THE BOTTLE AND TO AT LEAST 45 FT. LBS TORQUE. FITTINGS IN THE COVER MUST BE TIGHTENED TO A TORQUE OF 20 FT-LBS FOR 2"NPT FITTINGS AND 9 FT-LBS FOR 3/4" BUNGS, IF INSTALLED.**

meet UN performance standards. MAUSER is prepared to provide this training in addition to supplying closing instructions. It has been the practice of MAUSER to send closing instructions attached to the shipping documents with each shipment of drums. This document provides specific information on closing MAUSER packagings.

These closing instructions must be given to the individuals responsible for closing the packagings prior to shipment. A hard copy (printed) must be maintained by the filler or offeror for shipment. Copies should be immediately available at the fill lines.

The following tables and text give examples of the parts and closing torque required to prepare the drum or IBC for shipment so

## PACKAGING CLOSURE INFORMATION

### CLOSURE SPECIFICATIONS FOR TIGHT HEAD DRUMS

PLUGS MUST BE TORQUED TO THE FOLLOWING

IBC Type	Gasket Type	Torque
A Bulkdrum ® II	EPDM/FKM	70 ft.-lbs.
B MAUSER ® SM series 275/330 gallon	EPDM	70 ft.-lbs.
C MAUSER ® SM series 275/330 gallon	FKM/FPM	70 ft.-lbs.
D 2" plug in 150 mm lid, vented and solid	EPDM/FKM	20-25 ft.-lbs.
E 56 mm plug in 150 mm lid vented and solid	EPDM/FKM	20-25 ft.-lbs.

IBC Type	Gasket Type	Torque
A Bulkdrum ® II	EPDM/FKM	70 ft.-lbs.
B MAUSER ® SM series 275/330 gallon	EPDM	70 ft.-lbs.
C MAUSER ® SM series 275/330 gallon	FKM/FPM	70 ft.-lbs.
D 2" plug in 150 mm lid, vented and solid	EPDM/FKM	20-25 ft.-lbs.
E 56 mm plug in 150 mm lid vented and solid	EPDM/FKM	20-25 ft.-lbs.

All UN 31HA1 and 31 H01 Composite IBC's 49CFR § 178.707 (a) (5) that are supplied with lids, cages, pallets and service equipment must be closed for shipment using only the components supplied and specified in the design qualification tests for that IBC.

remove this plug. Fitting should be done through the 6" or 3" opening.)

VALVE NUT - 55 FT LBS  
note: caps, valves, and plugs must have gaskets to seal

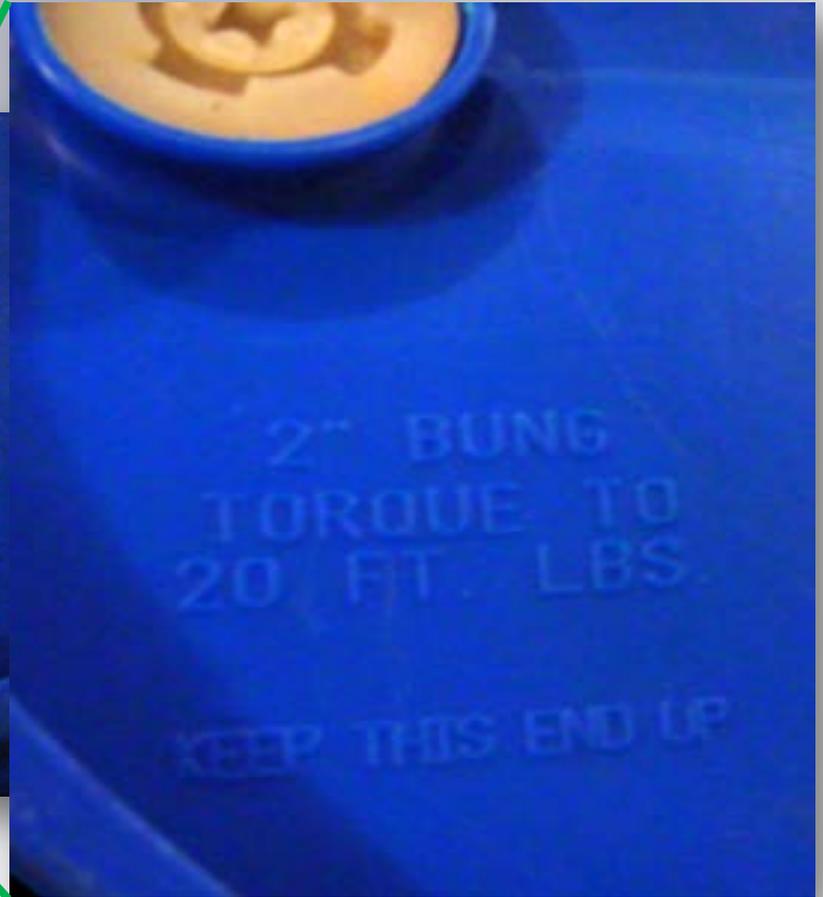
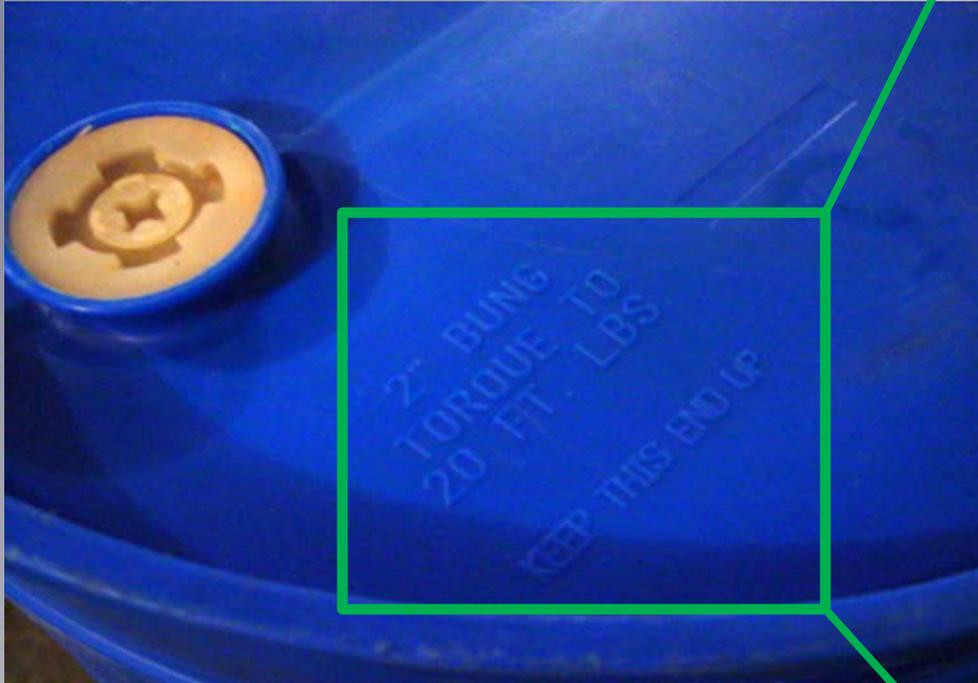
## CLOSURE SPECIFICATIONS FOR IBC'S

FILL PORT CAP AND VALVE MUST BE TORQUED TO THE FOLLOWING:

6" AND 9" FILL PORT CAP - 75 FT LBS

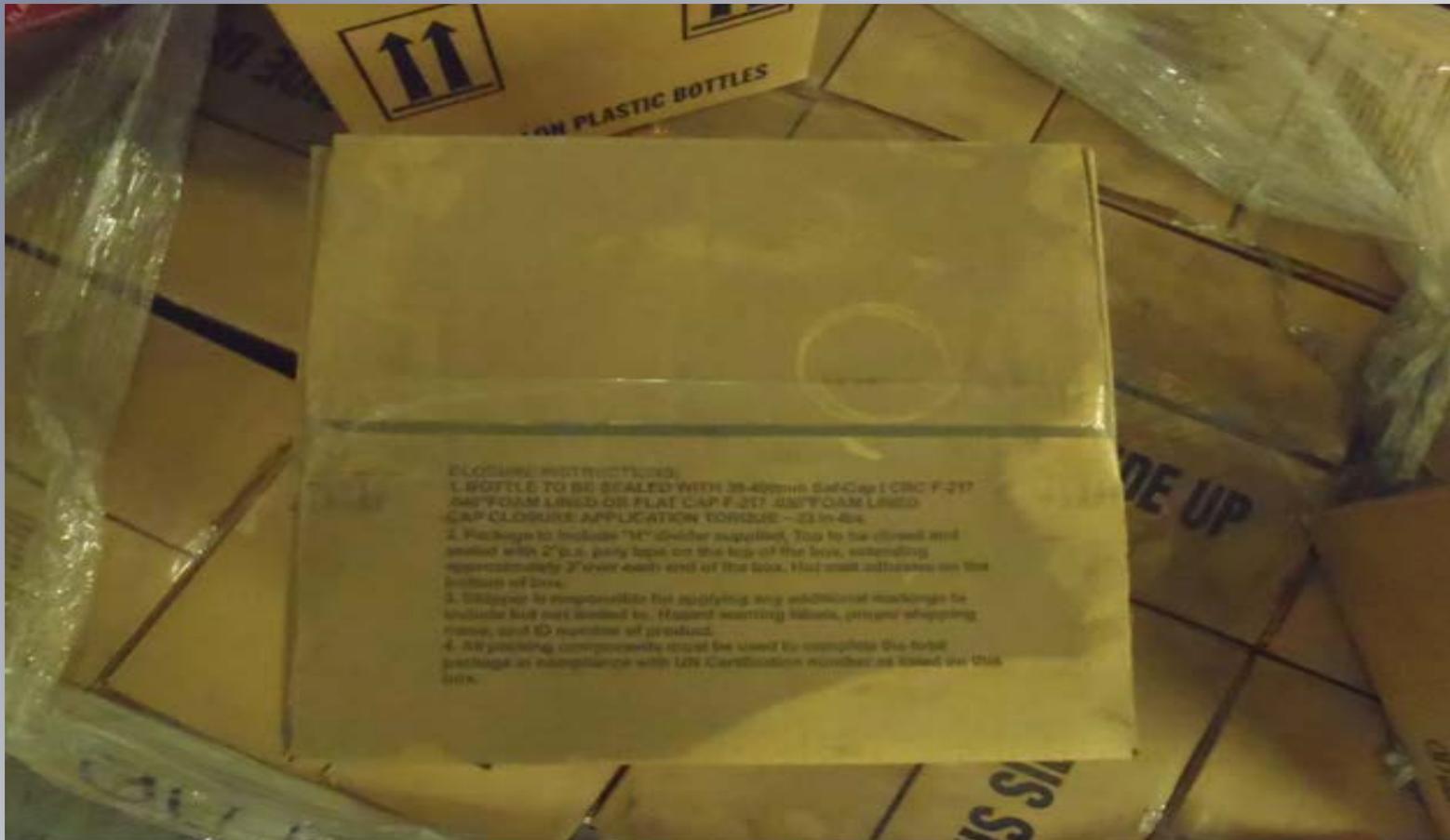


# Embossed





## Printed on Package





# Shipper Responsibility

- § 173.22(a)(4)
  - For a DOT Specification or UN standard packaging subject to the requirements of part 178 of this subchapter, **a person must perform all functions necessary to bring the package into compliance** with parts 173 and 178 of this subchapter, **as identified by the packaging manufacturer or subsequent distributor** (for example, applying closures consistent with the manufacturer's closure instructions) in accordance with §178.2 of this subchapter...



# Shipper Responsibility

- **§ 173.22(a)(4)**
  - A person must maintain a copy of the manufacturer's notification, including closure instructions ( see §178.2(c) of this subchapter) unless permanently embossed or printed on the packaging.
  
- **§ 173.27**
  - General requirements for transportation by aircraft



# UN Specification Marking Requirements Part 178, Subpart L

- Manufacturers test and mark packagings according to UN Standards
- Specified Codes used for marking
- Markings must be durable, legible and placed according to Subpart L



# Identification Code for UN Standard Packaging §178.502, §178.503(v)

## SINGLE PACKAGING



**Z – PGIII**  
(minor danger)

**Y – PGII**  
(medium  
danger)

**X – PGI**  
(great danger)



**1A1/Z1.4/150/05**  
**USA/0000**



# Identification Code for UN Standard Packaging

## COMBINATION PACKAGING



Removable Head

Inner Packaging



**1A2/Z40/S/05  
USA/0000**



# Marking Specification Packagings §178.503(a)

- **Durable**
  - Stamped
  - Embossed
  - Burned
  - Printed or otherwise marked
- **Legible**
  - Readily visible
- **Size**
  - Relative to packaging size
- **Location**
  - On non-removable component



# Questions on Package Selection?



## Markings that Communicate the Hazard

- **49 CFR Part 172 Subpart D Applicability**
  - Each person offering a hazardous material for transportation
  - Each carrier when assigned the function by Subpart D
- **General Markings that Identify the Hazardous Material Shipment**
  - Proper shipping name
  - UN identification number
  - Consignee or Consignor



# General Hazard Communication Markings §172.301





## **Additional Hazard Communication Markings**

- Technical Names – §172.301(b)
- Inhalation Hazard – §172.313(a)
- Marine Pollutant – §172.322
- RQ (Hazardous Substance) – §173.324



# Technical Names §173.301(b)



Symbols (1)	Hazardous Materials Descriptions and Proper Shipping Names (2)	Hazard Class or Division (3)	Identification Numbers (4)	PG (5)	Codes (6)	Provisions (§172.102) (7)	(8) Packaging (§173.***)			(9) Quantity Limitations	
							Excep- tions (8A)	Non- bulk (8B)	Bulk (8C)	Passenger aircraft/rail (9A)	Cargo air- craft only (9B)
G	Flammable liquid, n.o.s.	3	UN1993	I	3	T11, TP1, TP27,	150	201	243	1L	30L
				II	3	1B2, T7, TP1, TP8, TP28, B1,	150	202	242	5L	60L
				III	3	B52, IB3, T4, TP1, TP29	150	203	242	60L	220L



# Inhalation Hazard §172.313

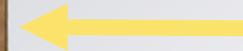


Optional with label



# Hazardous Substance and Marine Pollutants

## §172.322, §172.324





## Additional Requirements of Subpart D

- Prohibited marking – §172-303
- Limited Quantities – §172.301
- Special Permits/Exemption – §172.301(c)
  - DOT-SP
  - DOT-E
- Authorized abbreviations – §172.308
- Class 7 (radioactive) – §172.310
- Liquid hazardous materials – §172.312
  - Combination packagings
  - Vented closures
- ORM-D – §173.316
- Explosives – §172.320
- Infectious Substance – §172.323





# Column 8A Excepted Packagings



**CONSUMER COMMODITIES**

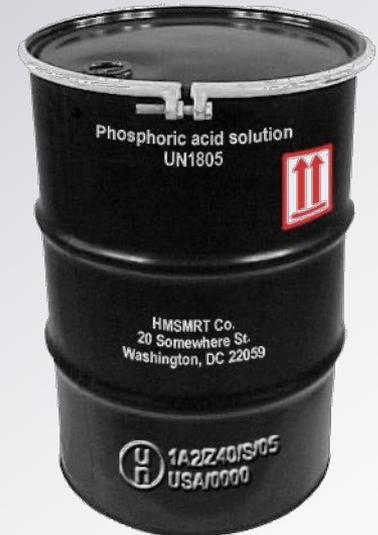


## Display of Markings §172.304

- Durable
- English
- Affixed to surface or label, tag or sign
- Sharply contrasting background
- Un-obscured by labels or other
- Located away from other marking such as advertising
- Only authorized abbreviations



# Display of Markings





# Marking Questions?



# Hazard Labels

- **49 CFR Part 172 Subpart E Applicability**
  - Each person offering a hazardous material for transportation
  - Exceptions - §172.400a
- **Hazard Labels**
  - Primary Hazard Class
  - Subsidiary Risk
- **Other Labels**
  - Cargo Aircraft Only





# Selecting Hazard Labels §172.402

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	
							Excep- tions (8A)	Non- bulk (8B)	Bulk (8C)	Passenger aircraft/rail (9A)	Cargo air- craft only (9B)
	Acrolein, stabilized	6.1	UN1092	I	6.1, 3	1, B9, B14, B30, B42, B72, 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	None	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, T4, TP1, TP29	150	201	243	1L	30L
				II	3		150	202	242	5L	60L
				III	3		150	203	242	60L	220L
	Phosphoric acid solution	8	UN1805	III	8	A7, IB3, N34, T4, TP1	154	203	241	5L	60L

## §172.101 Hazardous Materials Table Excerpts



# Labeling for Subsidiary Risks

## §172.402



Acrolein Stabilized



**Note:** ALL primary AND subsidiary labels MUST have the hazard class or division number displayed on each label



## Label Restrictions §172.401

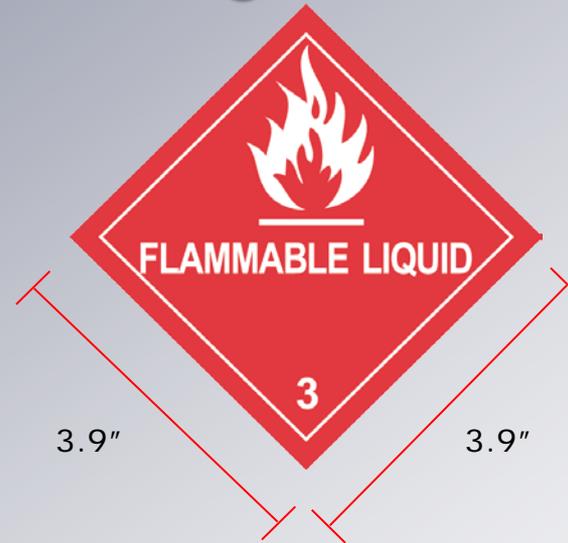
- Package contains a hazardous material
- Label represents the hazardous material inside package
- Label meets specification requirements of HMR



# Label Specifications §172.407

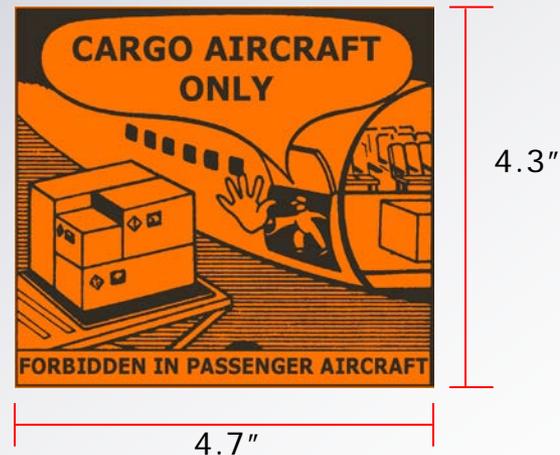
## ■ Hazard labels

- Design
- Size
- Color



## ■ Cargo Aircraft Only

- Rectangle
- Danger



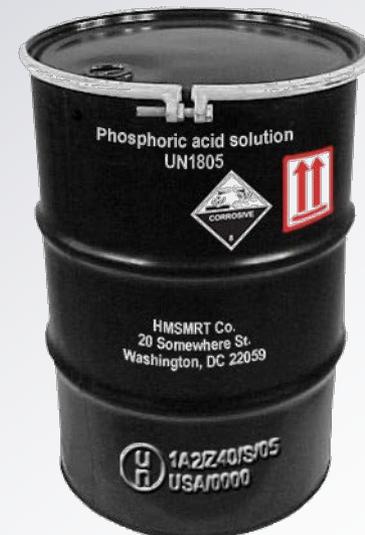


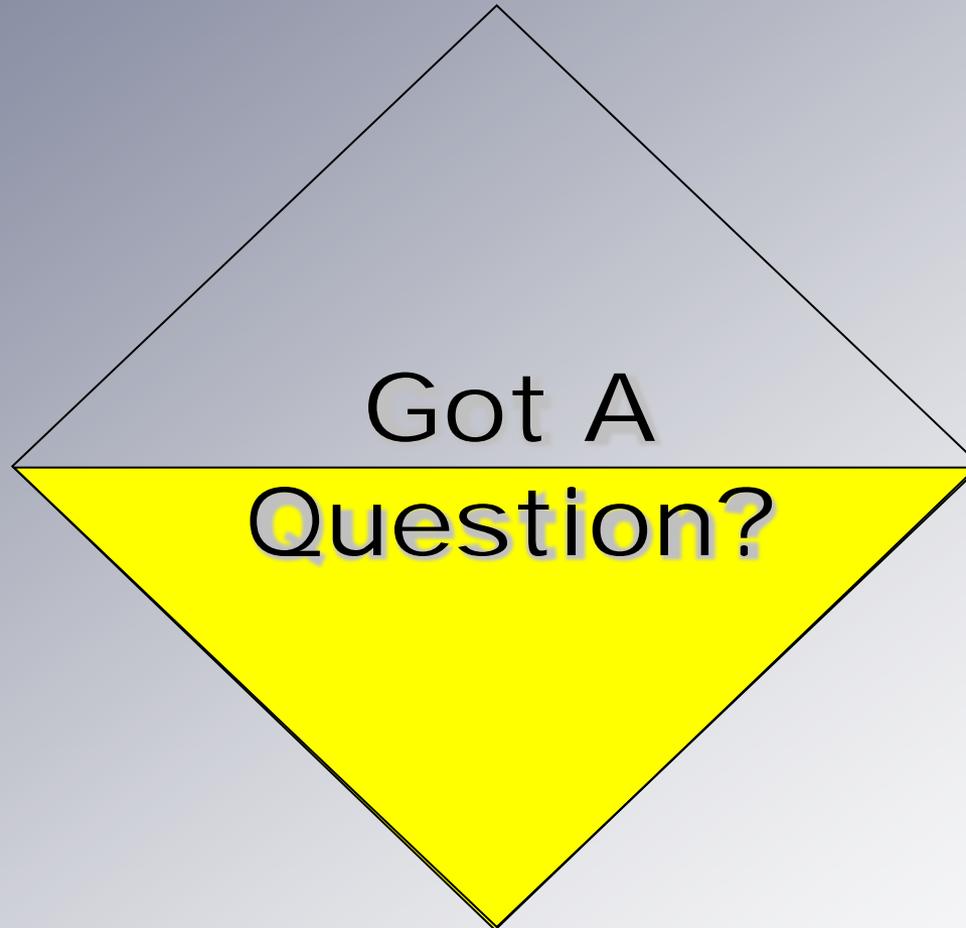
## Placement of Labels §172.406

- On package surface other than bottom
- Same surface near proper shipping name
- Affixed to tag
- Hazard labels
  - Primary and subsidiary label displayed next to each other
  - Within 6 inches
- Contrasting background
- Visible – not obscured



# Completed Examples







# 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

**2012 EMERGENCY RESPONSE GUIDEBOOK**  
A Guidebook for First Responders During the Initial Phase of Dangerous Materials Transportation Incidents

DOT Distributes Over 2 Million New Hazardous Materials Emergency Guidebooks to Nation's First Responders

**Hazmat News** | **Most Viewed Info**

**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

**Find PHMSA Offices**

Key Officials  
Regional Offices

**PHMSA/Hazmat Resources**

- 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**

<http://hazmat.dot.gov>



# 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