Package Selection, Marking, and Labeling Requirements
Objectives

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

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Hazardous Materials Descriptions and Proper Shipping Names</th>
<th>Hazard Class or Division</th>
<th>Identification Numbers</th>
<th>PG</th>
<th>Label Codes</th>
<th>Special Provisions (§172.102)</th>
<th>(8) Packaging (§173.***</th>
<th>(9) Quantity Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acrolein, stabilized</td>
<td>6.1</td>
<td>UN1092</td>
<td>I</td>
<td>6.1, 3</td>
<td>1, B9, B14, B30, B42, B72, B77, T22, TP2, TP7, TP13, TP38, TP44</td>
<td>None</td>
<td>226 244</td>
</tr>
<tr>
<td></td>
<td>Copper cyanide</td>
<td>6.1</td>
<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
<td>None</td>
<td>204 242</td>
</tr>
<tr>
<td>G</td>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
<td>UN1993</td>
<td>I</td>
<td>3</td>
<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
<td>150 150</td>
<td>201 243 243 1L 5L 60L 220L</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>II</td>
<td>3</td>
<td></td>
<td></td>
<td>202 242</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>III</td>
<td>3</td>
<td></td>
<td></td>
<td>203 242</td>
</tr>
<tr>
<td></td>
<td>Phosphoric acid solution</td>
<td>8</td>
<td>UN1805</td>
<td>III</td>
<td>8</td>
<td>A7, IB3, N34, T4, TP1</td>
<td>154 203 241</td>
<td>5L 60L</td>
</tr>
</tbody>
</table>

**§172.101 Hazardous Materials Table Excerpts**
### Column 8 Packaging (173.***)

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
<th>Column 6</th>
<th>Column 7</th>
<th>Column 8</th>
<th>Column 9</th>
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</thead>
<tbody>
<tr>
<td>Symbols</td>
<td>Hazardous Materials Descriptions and Proper Shipping Names</td>
<td>Hazard Class or Division</td>
<td>Identification Numbers</td>
<td>PG</td>
<td>Label Codes</td>
<td>Special Provisions (§172.102)</td>
<td>(8) Packaging (§173.***</td>
<td>(9) Quantity Limitations</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>Excretion (8A)</td>
<td>Non-bulk (8B)</td>
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<tr>
<td>Acrolein, stabilized</td>
<td>6.1</td>
<td>UN1092</td>
<td>I</td>
<td>6.1, 3</td>
<td>1, B9, B14, B30, B42, B72, B77, T22, TP2, TP7, TP13, TP38, TP44</td>
<td>None</td>
<td>226</td>
<td>244</td>
</tr>
<tr>
<td>Copper cyanide</td>
<td>6.1</td>
<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
<td>None</td>
<td>204</td>
<td>242</td>
</tr>
<tr>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
<td>UN1993</td>
<td>I</td>
<td>3</td>
<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
<td>150</td>
<td>201</td>
<td>243</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>II</td>
<td>3</td>
<td></td>
<td>150</td>
<td>202</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>III</td>
<td>3</td>
<td></td>
<td>150</td>
<td>203</td>
<td>242</td>
</tr>
<tr>
<td>Phosphoric acid solution</td>
<td>8</td>
<td>UN1805</td>
<td>III</td>
<td>8</td>
<td>A7, IB3, N34, T4, TP1</td>
<td>154</td>
<td>203</td>
<td>241</td>
</tr>
</tbody>
</table>

§172.101 Hazardous Materials Table Excerpts
§173.203
Non-Bulk Packagings for Liquid Hazardous Materials in Packing Group III

- Combination Packagings
- Single Packagings

1A2 STEEL DRUM
removable head
used as combination packaging

1A1 STEEL DRUM
non-removable head
used as single packaging

FIBERBOARD BOX
used as combination packaging showing inner packagings
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
- Comply with HMT Column 7, Special Provisions
### Column 7 Special Provisions

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Hazardous Materials Descriptions and Proper Shipping Names (2)</th>
<th>Hazard Class or Division (3)</th>
<th>Identification Numbers (4)</th>
<th>PG (5)</th>
<th>Label Codes (6)</th>
<th>Special Provisions (§172.102)</th>
<th>Exclusions (8A)</th>
<th>Non-bulk (8B)</th>
<th>Bulk (8C)</th>
<th>Passenger aircraft/rail (9A)</th>
<th>Cargo aircraft only (9B)</th>
<th>Quantity Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrolein, stabilized</td>
<td>6.1</td>
<td>UN1092</td>
<td>I</td>
<td>6.1, 3</td>
<td>1</td>
<td>B39, B14, B30, B42, B72, B77, T22, T3, TP2, TP7, TP13, TP38, TP44</td>
<td>None</td>
<td>226</td>
<td>244</td>
<td>Forbidden</td>
<td>Forbidden</td>
<td>25kg 100kg</td>
</tr>
<tr>
<td>Copper cyanide</td>
<td>6.1</td>
<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
<td>None</td>
<td>204</td>
<td>242</td>
<td>25kg 100kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
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<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
<td>150</td>
<td>201</td>
<td>243</td>
<td>1L</td>
<td>30L</td>
<td>201 202 242 5L 60L 220L</td>
<td></td>
</tr>
<tr>
<td>Phosphoric acid solution</td>
<td>8</td>
<td>UN1805</td>
<td>III</td>
<td>8</td>
<td>A7, IB3, N34, T4, TP1</td>
<td>154</td>
<td>203</td>
<td>241</td>
<td>5L</td>
<td>60L</td>
<td>201 202 242 5L 60L</td>
<td></td>
</tr>
</tbody>
</table>
Column 7 Special Provisions

- 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

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

§173.22 (a)(4)
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

SINGLE PACKAGING

Z – PGIII
(minor danger)

Y – PGII
(medium danger)

X – PGI
(great danger)

§178.502; §178.503
Identification Code for UN Standard Packaging

COMBINATION PACKAGING

Removable Head

Inner Packaging

1A2/Z40/S/05
USA/0000
Marking Specification
Packagings

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

§178.503(a)
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

- Proper Shipping Name
- Identification Number
- Orientation Arrows
- Consignor/Consinee

§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

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<td>150</td>
<td>1L</td>
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<td></td>
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<td></td>
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<td>60L</td>
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§172.301(b)
Inhalation Hazard

Optional with label

§172.313
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
- ORM-D – §173.316
- Explosives – §172.320
- Infectious Substance – §172.323
Column 8A Excepted Packagings

CONSUMER COMMODITIES
Display of Markings

- 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

§172.304
Display of Markings

Package Selection, Marking, and Labeling
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

### Symbols (1)

<table>
<thead>
<tr>
<th>Hazardous Materials Descriptions and Proper Shipping Names (2)</th>
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<th>Special Provisions (§172.102) (7)</th>
<th>Packaging (§173.***)? (8)</th>
<th>Quantity Limitations (9)</th>
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<td>1, B9, B14, B30, B42, B72, B77, T22, TP2, TP7, TP13, TP38, TP44</td>
<td>None</td>
<td>226 244</td>
</tr>
<tr>
<td>Copper cyanide</td>
<td>6.1</td>
<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
<td>None</td>
<td>204 242</td>
</tr>
<tr>
<td>Flammable liquid, n.o.s.</td>
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<td>UN1993</td>
<td>I</td>
<td>3</td>
<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
<td>150 150 150</td>
<td>201 202 203</td>
</tr>
<tr>
<td>Phosphoric acid solution</td>
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<td>UN1805</td>
<td>III</td>
<td>8</td>
<td>A7, IB3, N34, T4, TP1</td>
<td>154 203 241</td>
<td>5L 60L</td>
</tr>
</tbody>
</table>

§172.101 Hazardous Materials Table Excerpts

§172.402
Labeling for Subsidiary Risks

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

§172.402
Label Restrictions

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

§172.401
Label Specifications

- Hazard labels
  - Design
  - Size
  - Color

- Cargo Aircraft Only
  - Rectangle
  - Danger

§172.407
Placement of Labels

- 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 . . .

http://hazmat.dot.gov
How Can You Reach Us?

Hazardous Materials INFO-LINE

1-800-HMR49-22
(1-800-467-4922)

Hours of Operation: 9 am – 5 pm ET

– Obtain answers to HMR questions
– Request copies of Federal Register, exemptions or training materials
– Report HMR violations
– Fax on Demand

E-mail: infocntr@dot.gov