

Determining if a substance is a DOT Hazardous Material

The Department of Transportation has designated criteria in 49CFR, the Hazardous Materials Regulations (HMR), for determining what is considered hazardous for transportation. Definitions of hazardous material designations are included in 49CFR173 and the DOT Hazardous Materials Table 49CFR172.101 provides descriptions required for use during shipping.

- Class 1 (Explosives)
- Class 2 (Gasses)
- Class 3 (Flammable liquids)
- Class 4 (Flammable solids, Spontaneously combustibles, Water Reactives)
- Class 5 (Oxidizers and Organic Peroxides)
- Class 6 (Poisonous Material)
- Class 7 (Radioactive Material)
- Class 8 (Corrosive Materials)
- Class 9 (Environmentally Hazardous Material)

Training

Specific DOT training is required under 49CFR172.700 for personnel who perform any actions listed below regarding DOT hazardous materials.

- DOT hazardous material identification
- Loads or unloads hazardous materials
- Packages hazardous materials
- Labels and marks packaging
- Signs or prepares shipping papers
- Placarding
- Emergency response to hazardous material release
- Operates a vehicle used to transport hazardous materials

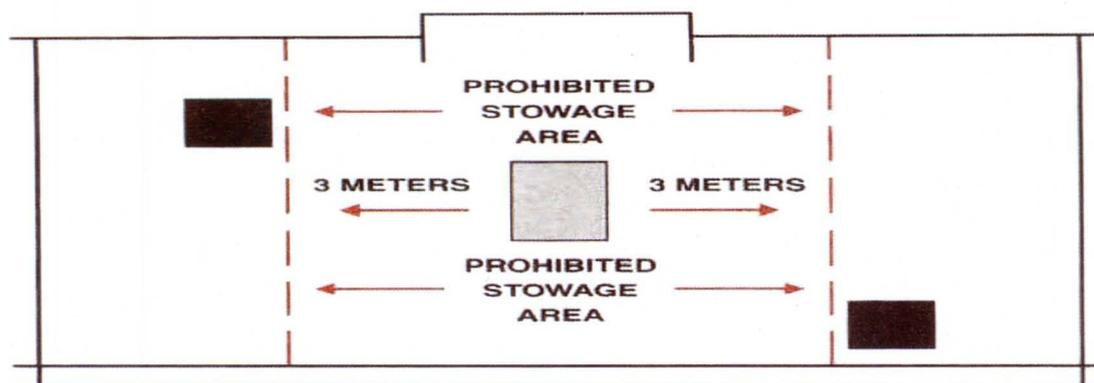
Table 176.83(D) - General Segregation Requirements for Hazardous Materials
 [Segregation must also take account of a single secondary hazard label, as required by paragraph (a)(6) of this section.]

Class	1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9	
	1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9	
Explosives, 1.1, 1.2, 1.5	(*)	(*)	(*)	(*)	(*)	(*)	4	2	2	4	4	4	4	4	4	2	4	2	4	X	
Explosives, 1.3	(*)	(*)	(*)	(*)	(*)	(*)	4	2	2	4	3	3	4	4	4	2	4	2	2	X	
Explosives, 1.4, 1.6	(*)	(*)	(*)	(*)	(*)	(*)	2	1	1	2	2	2	2	2	2	X	4	2	2	X	
Flammable gases 2.1	4	4	4	2	2	2	X	X	X	2	1	2	X	2	2	X	4	2	1	X	
Non-toxic, non-flammable gases 2.2	2	2	2	1	1	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X	
Poisonous gases 2.3	2	2	2	1	1	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X	
Flammable liquids 3	4	4	4	2	2	2	1	1	2	X	X	2	1	2	2	X	3	2	2	X	
Flammable solids 4.1	4	4	3	2	2	2	1	X	X	X	1	X	1	1	2	X	3	2	1	X	
Spontaneously combustible substances 4.2	4	4	3	2	2	2	1	1	2	2	1	X	1	2	2	1	3	2	1	X	
Substances which are dangerous when wet 4.3	4	4	4	2	2	2	X	X	X	1	X	1	X	2	2	X	2	2	1	X	
Oxidizing substances 5.1	4	4	4	2	2	2	X	X	X	2	1	2	2	X	2	1	3	1	2	X	
Organic peroxides 5.2	4	4	4	2	2	2	1	1	2	2	2	2	2	2	X	1	3	2	2	X	
Poisons 6.1	2	2	2	X	X	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X	
Infectious substances 6.2	4	4	4	4	4	4	2	2	2	3	3	3	2	3	3	1	X	3	3	X	
Radioactive materials 7	2	2	2	2	2	2	1	1	1	2	2	2	2	1	2	X	3	X	2	X	
Corrosives 8	4	4	2	2	2	1	X	X	X	X	1	1	1	2	2	X	3	2	X	X	
Miscellaneous dangerous substances 9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

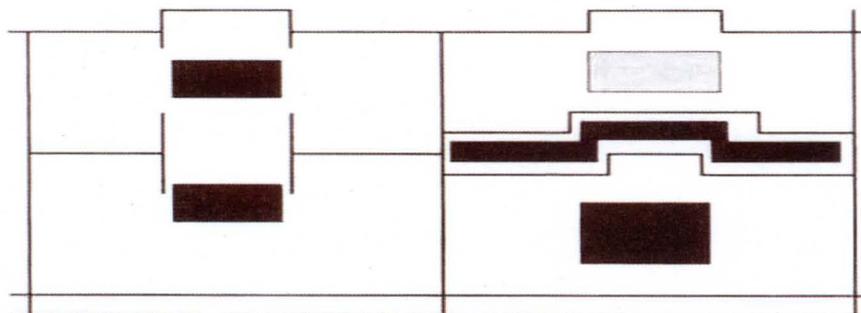
Numbers and symbols relate to the following terms as defined in this section:

- 1 — "Away from."
- 2 — "Separated from."
- 3 — "Separated by a complete compartment or hold from."
- 4 — "Separated longitudinally by an intervening complete compartment or hold from."
- X — The segregation, if any, is shown in the §172.101 Table.
- * — See §176.144 of this part for segregation within Class 1.

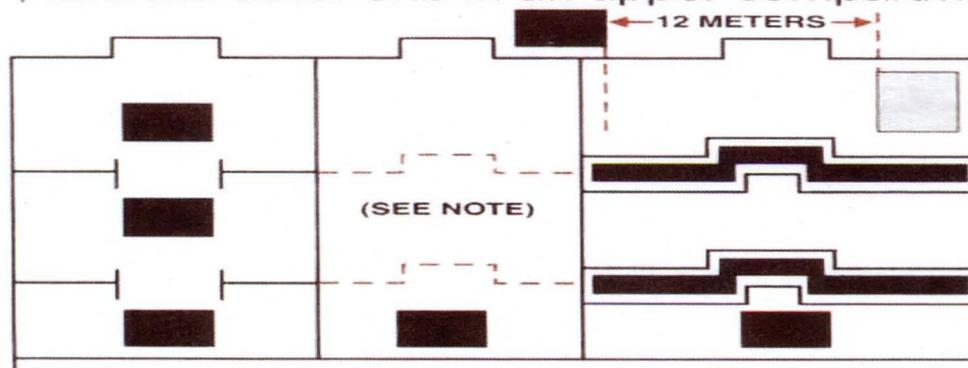
Away from: Effectively segregated so that the incompatible materials cannot interact dangerously in the event of an accident but may be carried in the same compartment or hold or on deck provided a minimum horizontal separation of 3 m (10 feet) projected vertically is obtained.



Separated From: In different compartments or holds when stowed under deck. If the intervening deck is resistant to fire and liquid, a vertical separation (i.e., in different compartments) is acceptable as equivalent to this segregation. For "on deck" stowage, this segregation means a separation by a distance of at least 6 m (20 feet) horizontally.



Separated by a complete compartment or hold from: Either a vertical or horizontal separation. If the intervening decks are not resistant to fire and liquid, then only a longitudinal separation (i.e., by an intervening complete compartment or hold) is acceptable. For "on deck" stowage, this segregation means a separation by a distance of at least 12 m (39 feet) horizontally. The same distance must be applied if one package is stowed "on deck", and the other one in an upper compartment.



Separated longitudinally by an intervening complete compartment or hold from: Vertical separation alone does not meet this requirement. Between a package "under deck" and one "on deck" a minimum distance of 24 m (79 feet) including a complete compartment must be maintained longitudinally. For "on deck" stowage, this segregation means a separation by a distance of at least 24 m (79 feet) longitudinally.



U.S. Department
of Transportation
**Pipeline and
Hazardous Materials
Safety Administration**

DOT CHART 13

Hazardous Materials Marking, Labeling and Placarding Guide



Refer to 49 CFR, Part 172:

Marking - Subpart D

Labeling - Subpart E

Placarding - Subpart F

Emergency Response - Subpart G

NOTE: This document is for general guidance only and must not be used to determine compliance with 49 CFR, Parts 100-185.

Hazardous Materials Warning Labels

Actual label size: at least 100 mm (3.9 inches) on all sides

CLASS 1 Explosives:
Divisions 1.1, 1.2, 1.3, 1.4, 1.5, 1.6



CLASS 2 Gases:
Divisions 2.1, 2.2, 2.3



CLASS 3 Flammable Liquid



CLASS 4 Flammable Solid, Spontaneously Combustible, and Dangerous When Wet:
Divisions 4.1, 4.2, 4.3



CLASS 5 Oxidizer, Organic Peroxide: Divisions 5.1 and 5.2



\$172.411

* Include compatibility group letter.

** Include division number and compatibility group letter.

\$172.405(b), \$172.415, \$172.416, \$172.417

\$172.419

\$172.420, \$172.422, \$172.423

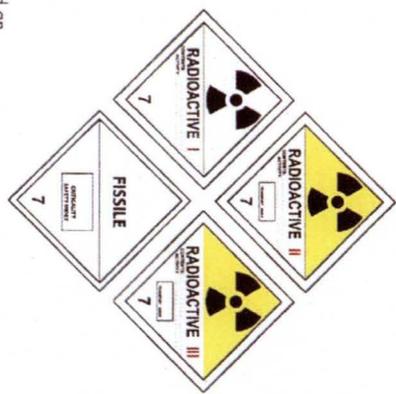
\$172.426, \$172.427

Organic Peroxide, Transition-2011

CLASS 6 Poison (Toxic), Poison Inhalation Hazard, Infectious Substance: Divisions 6.1 and 6.2



CLASS 7 Radioactive



CLASS 8 Corrosive



\$172.442

CLASS 9 Miscellaneous Hazardous Material



\$172.446

Subsidiary Risk Label
Cargo Aircraft Only



\$172.411

\$172.448

For Regulated Medical Waste (RMW), on Infectious Substance label is not required on outer packaging if the OSHA Biohazard marking is used as prescribed in 29 CFR 1910.1030(g). CDC Etiologic Agent label must be used as prescribed in 42 CFR 72.3 and 72.6. A bulk package of RMW must display a BIOHAZARD marking.
\$172.323, \$172.405(c), \$172.429, \$172.430, \$172.432



\$172.436, \$172.438, \$172.440, \$172.441

HAZARDOUS MATERIALS MARKINGS

Package Orientation
(Red or Black)



or

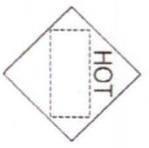


OVERPACK

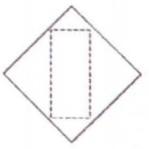
Replaces

INNER PACKAGES COMPLY WITH PRESCRIBED SPECIFICATIONS

October 1, 2007



HOT



HOT

Fungicert Marking (Red or Black)



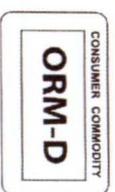
Biological Substances,
Category B



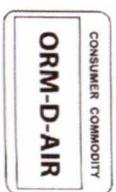
\$172.322



\$172.313(e)



CONSUMER COMMUNITY



CONSUMER COMMUNITY

\$172.316(e)

\$172.312(e)

\$172.317

\$173.25(a)(4)

\$172.325

\$172.332(e)

\$172.302(g) and \$173.9

\$173.199(a)(5)

\$172.313(e)

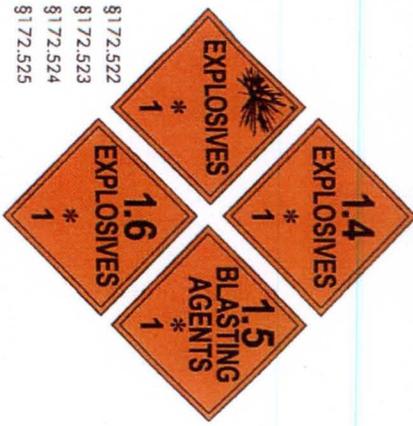
\$172.316(e)

Keep a copy of the Emergency Response Guidebook handy!

Hazardous Materials Warning Placards

Actual placard size: at least 273 mm (10.8 inches) on all sides

CLASS 1 Explosives



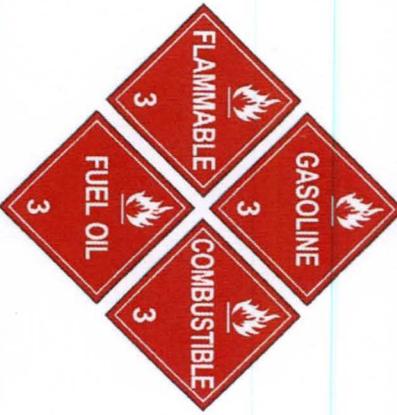
* For Divisions 1.1, 1.2, or 1.3, enter division number and compatibility group letter, when required; placard any quantity. For Divisions 1.4, 1.5, and 1.6, enter compatibility group letter, when required; placard 454 kg (1,001 lbs) or more.

CLASS 2 Gases



For NON-FLAMMABLE GAS, OXYGEN (compressed gas or refrigerated liquid), and FLAMMABLE GAS, placard 454 kg (1,001 lbs) or more gross weight. For POISON GAS (Division 2.3), placard any quantity.

CLASS 3 Flammable Liquid and Combustible Liquid



For FLAMMABLE, placard 454 kg (1,001 lbs) or more. GASOLINE may be used in place of FLAMMABLE placard displayed on a cargo tank or portable tank transporting gasoline by highway. Placard combustible liquid transported in bulk. See §172.504(f)(2) for use of FLAMMABLE placard in place of COMBUSTIBLE. FUEL OIL may be used in place of COMBUSTIBLE on a cargo or portable tank transporting fuel oil not classed as a flammable liquid by highway.

CLASS 4 Flammable Solid, Spontaneously Combustible, and Dangerous When Wet



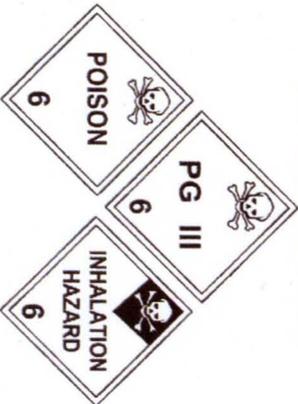
For FLAMMABLE SOLID and SPONTANEOUSLY COMBUSTIBLE, placard 454 kg (1,001 lbs) or more. For DANGEROUS WHEN WET (Division 4.3), placard any quantity.

CLASS 5 Oxidizer & Organic Peroxide



Organic Peroxide, Transition-2011 (rail, vessel, and aircraft) 2014 (highway)

CLASS 6 Poison (Toxic) and Poison Inhalation Hazard



For POISON (PGI or PGII, other than inhalation hazard) and POISON (PGIII), placard 454 kg (1,001 lbs) or more. For POISON-INHALATION HAZARD (Division 6.1), inhalation hazard only, placard any quantity.

CLASS 7 Radioactive



§172.556

Placard any quantity - packages bearing RADIOACTIVE YELLOW-III labels only. Certain low specific activity radioactive materials in "exclusive use" will not bear the label, but the radioactive placard is required for exclusive use shipments of low specific activity material and surface contaminated objects transported in accordance with §172.504(e) Table 1 and §173.427(a)(6).

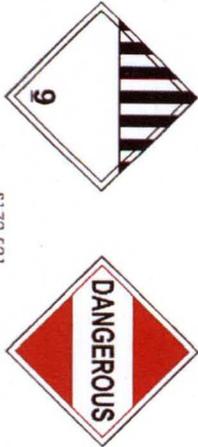
CLASS 8 Corrosive



§172.558

For CORROSIVE, placard 454 kg (1,001 lbs) or more.

CLASS 9 Miscellaneous



§172.560

Not required for domestic transportation. A bulk packaging containing a Class 9 material must be marked with the appropriate ID number displayed on a Class 9 placard, an orange panel, or a white square-on-point display.

§172.521

A freight container, unit load device, transport vehicle, or rail car which contains non-bulk packages with two or more categories of hazardous materials that require different placards specified in Table 2 may be placarded with DANGEROUS placards instead of the specific placards required for each of the materials in Table 2. However, when 1,000 kg (2,205 lbs) or more of one category of material is loaded at one loading facility, the placard specified in Table 2 must be applied.

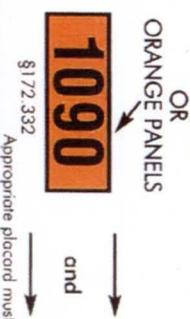
§172.550, §172.552

For OXIDIZER and ORGANIC PEROXIDE (other than TYPE B, temperature controlled), placard 454 kg (1,001 lbs) or more. For ORGANIC PEROXIDE (Division 5.2), Type B, temperature controlled, placard any quantity.

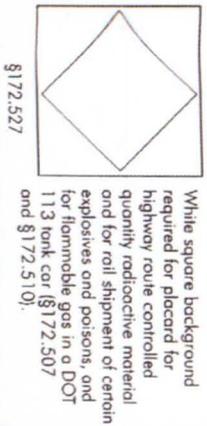
§172.504(f)(1)(i), §172.554, §172.555

For POISON (PGI or PGII, other than inhalation hazard) and POISON (PGIII), placard 454 kg (1,001 lbs) or more. For POISON-INHALATION HAZARD (Division 6.1), inhalation hazard only, placard any quantity.

PLACARDS OR ORANGE PANELS



MUST BE DISPLAYED ON: (1) Tank Cars, Cargo Tanks, Portable Tanks, and other Bulk Packagings; (2) Vehicles or containers containing 4,000 kg (8,820 lbs) in non-bulk packages of only a single hazardous material having the same proper shipping name and identification number, and (3) 1,000 kg (2,205 lbs) of materials poisonous by inhalation in Hazard Zone A or B. See §172.301(a)(3) and §172.313(c).



§172.527

White square background required for placard for highway route controlled quantity radioactive material and for rail shipment of certain explosives and poisons, and for flammable gas in a DOT 113 tank car (§172.507 and §172.510).

Response begins with identification!

General Guidelines on Use of Warning Labels and Placards

LABELS

See 49 CFR, Part 172, Subpart E, for complete labeling regulations.

- The Hazardous Materials Table [§172.101, Col. 6] identifies the proper label(s) for the hazardous material listed.
- Any person who offers a hazardous material for transportation MUST label the package, if required [§172.400(a)].
- Labels may be affixed to packages when not required by regulations, provided each label represents a hazard of the material contained in the package [§172.401].
- The appropriate hazard class or division number must be displayed in the lower corner of a primary and subsidiary hazard label [§172.402(b)].
- For classes 1,2,3,4,5,6, and 8, text indicating a hazard (e.g., "CORROSIVE") is NOT required on a primary or subsidiary label. The label must otherwise conform to Subpart E of Part 172 [§172.405].
- Labels must be printed on or affixed to the surface of the package near the proper shipping name marking [§172.406(a)].
- When primary and subsidiary labels are required, they must be displayed next to each other [§172.406(c)].
- For a package containing a Division 6.1, PG III material, the POISON label specified in §172.430 may be modified to display the text PG III instead of POISON or TOXIC. Also see §172.313(d).
- The new ORGANIC PEROXIDE label becomes mandatory on 1 January 2011 and reflects the fact that organic peroxides are highly flammable and eliminates the requirements for a flammable liquid subsidiary label [§172.427]. For information, see §171.14.

PLACARDS

See 49 CFR, Part 172, Subpart F, for complete placarding regulations.

- Each person who offers for transportation or transports any hazardous material subject to the Hazardous Materials Regulations must comply with all applicable requirements of Subpart F [§172.500].
- Placards may be displayed for a hazardous material, even when not required, if the placarding otherwise conforms to the requirements of Subpart F of Part 172 [§172.502(c)].
- For other than Class 7 or the DANGEROUS placard, text indicating a hazard (e.g., "FLAMMABLE") is not required. Text may be omitted from the OXYGEN placard only if the specific ID number is displayed on the placard [§172.519(b)(3)].
- For a placard corresponding to the primary or subsidiary hazard class of a material, the hazard class or division number must be displayed in the lower corner of the placard.
- Any bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of material listed in Table 1 must be placarded [§172.504].
- When the gross weight of all hazardous materials in non-bulk packages covered in Table 2 is less than 454 kg (1,001 lbs), no placard is required on a transport vehicle or freight container [§172.504(c)].
- Notes: See §172.504(f)(10) for placarding Division 6.1, PG III materials.
- Placarded loads require registration with USDOT. See §107.601 for registration regulations.
- The new ORGANIC PEROXIDE placard becomes mandatory 1 January 2011 for transportation by rail, vessel, or aircraft and 1 January 2014 for transportation by highway. The placard will enable transport workers to readily distinguish peroxides from oxidizers [§172.552]. For information, see §171.14.

Placarding Tables [§172.504(e)]

TABLE 1
(Placard any quantity)

Category of material (Hazard Class or division number and additional description, as appropriate)	Placard name
1.1	EXPLOSIVES 1.1
1.2	EXPLOSIVES 1.2
1.3	EXPLOSIVES 1.3
2.3	POISON GAS
4.3	DANGEROUS WHEN WET
5.2 (Organic peroxide, Type B, liquid or solid, temperature controlled)	ORGANIC PEROXIDE
6.1 (materials poisonous by inhalation (see §171.8 of this subchapter))	POISON INHALATION HAZARD
7 (Radioactive Yellow III label only)	RADIOACTIVE ¹

¹ RADIOACTIVE placard also required for exclusive use shipments of low specific activity material and surface contaminated objects transported in accordance with §173.427(a)(6).

TABLE 2
(Placard 1,001 lbs or more)

Category of material (Hazard Class or division number and additional description, as appropriate)	Placard name
1.4	EXPLOSIVES 1.4
1.5	EXPLOSIVES 1.5
1.6	EXPLOSIVES 1.6
2.1	FLAMMABLE GAS
2.2	NON-FLAMMABLE GAS
3	FLAMMABLE
Combustible Liquid	COMBUSTIBLE
4.1	FLAMMABLE SOLID
4.2	SPONTANEOUSLY COMBUSTIBLE
5.1	OXIDIZER
5.2 (Other than organic peroxide, Type B, liquid or solid, temperature controlled)	ORGANIC PEROXIDE
6.1 (Other than materials poisonous by inhalation)	POISON
6.2	(None)
8	CORROSIVE
9	Class 9 (see §172.504(f)(9))
ORM-D	(None)

Inhalation Hazard Materials [§172.313, §172.540, §172.555]



Materials which meet the inhalation toxicity criteria have additional "communication standards" prescribed by the HMR. The words "Poison-Inhalation hazard" or "Toxic-Inhalation hazard" and the words "Zone A", "Zone B", "Zone C", or "Zone D" for gases or "Zone A" or "Zone B" for liquids, as appropriate, shall be entered on the shipping paper as required by §172.203(m). Packagings must be marked "Inhalation Hazard" or, alternatively, when the words "Inhalation Hazard" appear on the label or placard, the "Inhalation Hazard" marking is not required on the package. Transport vehicles, freight containers, portable tanks and unit load devices that contain a poisonous material subject to the "Poison-Inhalation Hazard" shipping description, must be placarded with a POISON INHALATION HAZARD or POISON GAS placard, as appropriate. This shall be in addition to any other placard required for that material [§172.504].

For complete details, refer to one or more of the following:

- Code of Federal Regulations, Title 49, Transportation, Parts 100-185. [All modes]
- International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air. [Air]
- International Maritime Dangerous Goods (IMDG) Code. [Water]
- Transportation of Dangerous Goods Regulations of Transport Canada. [Rail and Highway]



U.S. Department
of Transportation
**Pipeline and
Hazardous Materials
Safety Administration**

Copies of this Chart may be obtained by contacting:

USDOT/PHMSA/OHMIT/PHH-50
1200 New Jersey Avenue, SE
Washington, D.C. 20590
or
Phone: 202-366-2301
Email: training@dot.gov
Website: <http://hazmat.dot.gov>