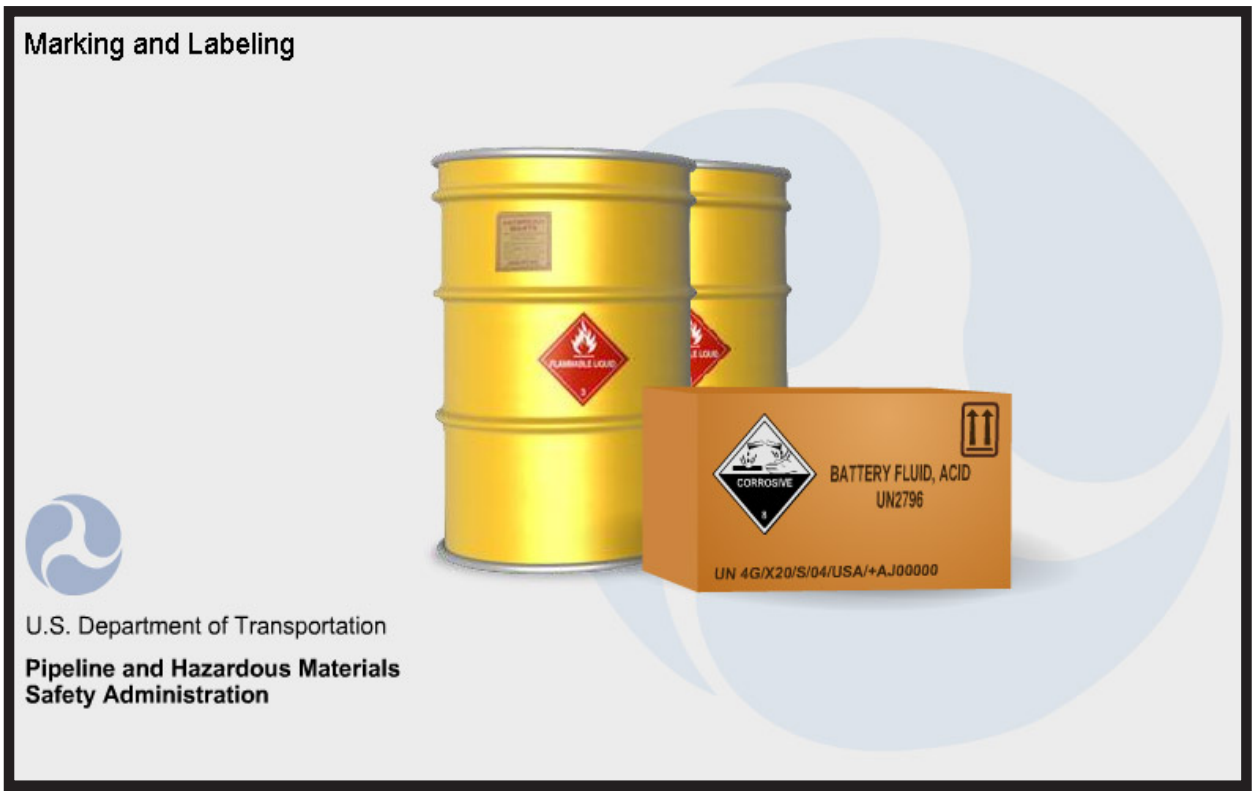
Hazardous Materials Transportation Training Modules

VERSION 5.1

STUDENT



MODULE 3

Script

Visual

Narrative

1

Marking and Labeling are part of the Department of Transportation's overall communications requirements. This module can not serve as a resource for the design or manufacture of DOT specified marks and labels. You may, however, refer to the DOT Chart 12 in your references for a visual representation of any marking, label, or hazardous materials placard. Please see 49 CFR §172.300-450 for detailed specifications, if you originate any marking or part of a marking (such as an ID number). The individual offering hazardous materials must use these marks and labels to communicate the hazards of that shipment to the people who may be exposed to the hazard, such as truckers and emergency responders. This module reviews the marking and labeling information contained within the Hazardous Materials Regulations. It trains you in the appropriate use, and the visual identification of, marks and labels required in the HMR. Remember, your attention to detail during this lesson may help save another person's life during a hazardous materials incident, so if you are ready, let's get started.

2

After completing Module 3 on Marking and Labeling, you should be able to:

- Apply the requirements for marking hazardous materials packages, freight containers, and/or transportation vehicles and any exceptions to these requirements.
- Apply the requirements for labeling hazardous materials packages, overpacks, and freight containers, and any exceptions to these requirements.
- Identify special types of labeling that might be required for international shipments, water shipments, and air shipments.

3

When you offer a hazardous material for transportation, or transport a hazardous material, you must mark each package, freight container, and transport vehicle containing the hazardous material in the manner required by the HMR. The term marking as used in the HMR refers to placing the required information on the outer package containing the hazardous materials. This includes a proper shipping name , identification number with the appropriate prefix, specifications or UN markings, plus any other required information, instructions and/or cautions. This module assumes that the manufacturer has assigned the proper shipping name, ID number, hazard class or division number, and packing group number, and the student is able to correctly use the Hazardous Materials Table.

4

Each person who offers a hazardous material for transportation in a non-bulk packaging must mark the package with the required information for the material as shown in the HM Table. The items of required information are shown here. Select each button to learn more about the marking requirements for these non-bulk packagings.

4a

You must mark hazardous material offered for transportation in a non-bulk packaging with the proper shipping name and identification number, unless excepted. The proper shipping name for a hazardous waste is not required to include the word “waste” if the package bears the EPA marking prescribed by 40 CFR 262.32.

4b

You must mark each package with the identification number, preceded by ‘‘UN’’ or ‘‘NA,’’ as appropriate, for the material as shown in the HMT. Identification numbers are not required on packagings that contain only ORM–D materials or limited quantities. A transport vehicle or freight container containing only a single hazardous material in non-bulk packages must be marked, on each side and each end with the identification number specified for the hazardous material in the HMT.

4c

You must mark each non-bulk packaging containing hazardous materials with the technical name in parentheses in association with the proper shipping name in accordance with the requirements and exceptions specified for display of technical descriptions on shipping papers.

4d

You must plainly and durably mark the outside of each package authorized by an special permit with ‘‘DOT–SP,’’ followed by the special permit number assigned.

4e

You must mark a non-bulk packaging containing a hazardous material offered for transportation, with the name and address of the consignor or consignee, except when that package is transported by highway only and will not be transferred from one motor carrier to another; or the package is part of a carload lot, truckload lot or freight container load, and the entire contents of the rail car, truck or freight container are shipped from one consignor to one consignee.

5

Professor Fed's Knowledge Check 1

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

You are asked to inspect a non-bulk package of a hazardous material being shipped as a limited quantity. Which of these marking requirements is NOT required on this package?

A. U.S. DOT Exemption Information, if applicable
B. Identification number
C. Technical name (if applicable)
D. Consignee's or Consignor's name and address

6

You must pack each non-bulk combination package having inner packagings containing liquid hazardous materials with closures upward. It must have legible package orientation markings on two opposite vertical sides, with the arrows pointing in the correct upright direction. Depicting a rectangular border around the arrows is optional. You may not display arrows for purposes other than indicating proper package orientation on a package containing a liquid hazardous material. Listed here are six instances where the requirement for package orientation arrows do not apply.

7

Except as otherwise provided for in the HMR, a package containing a limited quantity of hazardous materials is not required to be marked with the proper shipping name provided it is marked with the identification number, preceded by the letters ‘‘UN’’ or ‘‘NA,’’ as applicable, for the entry as shown in the HMT, and placed within a square-on-point border with the ID number marking placed on a durable surface, and legible and of such a size relative to the package as to be readily visible. The marking must be applied on at least one side or one end of the outer packaging. When two or more hazardous materials with different ID numbers are contained in the package, the packaging must be marked with either individual square-on-points bearing a single ID number or a single square-on-point large enough to include each applicable ID number.

8

Each non-bulk packaging containing a material classed as Other Regulated Material – Domestic (ORM–D) must be marked on at least one side or end with the ORM–D designation immediately following or below the proper shipping name of the material. The designation for ORM–D must be ORM–D–AIR for an ORM–D that is prepared for air shipment. When the ORM–D marking including the proper shipping name cannot be affixed on the package surface, it may be on an attached tag. The marking ORM–D is the certification by the person offering the packaging for transportation that the material is properly described, classed, packaged, marked and labeled and in proper condition for transportation according to the applicable regulations. This form of certification does not preclude the requirement for a certificate on a shipping paper when required by subpart C of the HMR.

9

Professor Fed's Knowledge Check 2

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Marking the ORM-D designation in a rectangle following or below the proper shipping name on a non-bulk package _____ that the package is in proper condition for transportation. The marking certification does not take the place of the shipping paper certification, if required.

A. certifies
B. ensures
C. negates
D. validates

10

You must mark any non-bulk packaging that contains a marine pollutant with the “Marine Pollutant” marking, for vessel transportation. Also, mark the name of the marine pollutant on the package in parentheses in association with the marked proper shipping name. Where two or more components make a material a marine pollutant, the names of at least two of these components must appear in parentheses in association with the marked proper shipping name. Place the MARINE POLLUTANT mark in association with the hazard warning labels required by the HMR, or in the absence of any labels, with the marked proper shipping name. The symbol, letters and border of the MARINE POLLUTANT mark must be black and the background white, or the symbol, letters, border and background must be of contrasting color to the surface to which the mark is affixed. Each side of the mark must be at least 100 mm (3.9 inches) for marks applied to non-bulk packagings, except in the case of packagings which, because of their size, can only bear smaller marks.You must also mark a transport vehicle or freight container that contains a package subject to these marking requirements, with the MARINE POLLUTANT mark. The mark must appear on each side and each end of the transport vehicle or freight container, and must be visible from the direction it faces. This requirement may be met by the markings displayed on a freight container or portable tank loaded on a motor vehicle or rail car. This mark may be displayed in black lettering on a white square-on-point configuration having the same outside dimensions as a placard.

11

You must mark each non-bulk package containing a hazardous substance with the name of the hazardous substance, in parentheses, in association with the proper shipping name, if the proper shipping name does not identify the hazardous substance by name. If the material contains two or more hazardous substances, identify at least two hazardous substances, including the two with the lowest reportable quantities (RQs). Mark "RQ" on the package in association with the proper shipping name. Packages of radioactive material labeled under §172.403 are excepted from this requirement. For a hazardous waste, the waste code (e.g., D001), if appropriate, may be used to identify the hazardous substance.

12

Professor Fed's Knowledge Check 3

Instructions: Click and drag the response to the blank line that correctly completes the statement. Each response may only be used once. You will have two chances to answer this exercise correctly. Select the Done button when you are finished to receive feedback.

Cargo Aircraft Only	Identification Numbers	Marine Pollutant
Infectious substance	PG	ORM-D
ORM-D-Air	RQ	Packing Group numbers

1. _____ are not required on packaging that contains only ORM-D materials or limited quantities.

2. The _____ mark must be placed in association with the hazard warning labels or the proper shipping name for non-bulk packaging containing materials listed in Appendix B to §172.101 and shipped by vessel transport.

3. The letters _____ must be marked on a package containing a hazardous substance in association with the proper shipping name.

4. A consumer commodity prepared for air shipment in a non-bulk packaging must display the _____ marking.

13

Now we'll look at the general marking requirements for bulk packagings. You must mark a bulk packaging containing hazardous material which you transport or offer for transportation, with that material's identification number. Each bulk packaging marked with a proper shipping name, common name or identification number must remain marked when it is emptied unless it is sufficiently cleaned of residue and purged of vapors to remove any potential hazard. If you use a bulk packaging under the terms of a special permit, plainly and durably mark ''DOT–SP'' on it, followed by the special permit number assigned. Select each button to learn more about the general marking requirements for bulk packaging.

13a

13b

13c

13d

14

No person may offer for transportation or transport a package, which is marked with the proper shipping name or identification number of a hazardous material unless that package actually contains the identified hazardous material or its residue. Exceptions to this requirement exist when:

- The package is not visible during transportation and is loaded by the shipper and unloaded by the shipper or consignee;
- The markings on the package are securely covered in transportation; and
- The marking of a shipping name on the package describes a material not regulated under the HMR.

15

Professor Fed's Knowledge Check 4

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Which one of these four statements is NOT correct concerning the general marking requirements for bulk packagings of hazardous materials?

A. The outside of each bulk package used under the terms of a DOT Exemption must be plainly and durably marked "DOT-E" followed by the exemption number assigned.
B. A hazardous material in a bulk packaging of 3,785 L or more must be marked with the proper ID number on each side and each end.
C. A rail car or freight container that has been fumigated with any hazardous material must be marked with the Fumigant label.
D. You may remove markings from a tank car marked with a proper shipping name, common name or identification number when it is emptied, and only contains residue of hazardous materials.

16

The HMR states that markings must be:

- placed on a durable material;
- written in English;
- printed on or affixed to the surface of the package or on a label, tag, or sign;
- displayed on a background of sharply contrasting color;
- unobscured by labels or attachments;
- and located away from any other marking such as advertising, that could substantially reduce the hazardous materials marking's effectiveness.

17

You may not use abbreviations in a proper shipping name marking except as provided for in §172.308.

You may use the abbreviation ''ORM'' or "ORM-D" in place of the words ''Other Regulated Material.'' You may also use abbreviations which appear as authorized descriptions in column 2 of the HMT . Some examples include: EEI, HMX, n.o.s., PCB, PETN, RDX, SA, and TNT.

18

Professor Fed's Knowledge Check 5

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Which one of these four statements is NOT a general marking requirement for hazardous materials?

A. The marking must be durable, in English and printed on or affixed to the surface of a package or on a label, tag, or sign.
B. The marking must be displayed on a white or black background.
C. The marking must be unobscured by labels or other attachments.
D. The markings must be located away from any other marking, such as an advertisement, that could substantially reduce the effectiveness of the marking.

19

In addition to any other markings required by the HMR, you must mark each package containing a Class 7 - Radioactive materials in the following manner. Mark the package's gross mass including the unit of measurement, which may be abbreviated, on the outside of the package, if its gross mass is greater than 50 kg or 110 pounds.

Legibly and durably mark the outside of each industrial, Type A, Type B(U), or Type B(M) package, in letters at least 13 mm (0.5 in) high, with the words ''TYPE IP–1,'' ''TYPE IP–2,'' ''TYPE IP–3,'' ''TYPE A,'' ''TYPE B(U)'' or ''TYPE B(M),'' as appropriate. A package which does not conform to these standards may not be so marked. Legibly and durably mark the outside of each package which conforms to an IP–1, IP–2, IP–3 or a Type A package design, with the international vehicle registration code of the country of origin of the design. The international vehicle registration code for packages designed by a United States company or agency is the symbol ''USA.'' Plainly mark a radiation symbol on the fire- and water-resistant outermost receptacle of each package which conforms to a Type B(U) or Type B(M) package design. This mark must be embossed, stamped or applied by other means resistant to the effects of fire and water. Mark "USA" in conjunction with the specification marking, or other package certificate identification on each Type B(U), Type B(M) or fissile material package destined for export.

20

In addition to any other markings required of hazardous materials by the HMR, poisonous hazardous materials require several additional markings. You must mark a material poisonous by inhalation ''Inhalation Hazard,'' in association with the required labels or placards, and the shipping name. You must mark a transport vehicle or freight container containing a material poisonous by inhalation in non-bulk packages, if it is loaded at one facility with 1,000 kg or more aggregate weight. If the aggregate gross weight comprises two or more such materials, use the ID number of the material with the greatest aggregate gross weight. For different materials in both Hazard Zones A and B, use the mark with the ID number of the Hazard Zone A material. For a packaging containing a Division 6.1 PG III material, ''PG III'' may be marked adjacent to the POISON label.

21

Professor Fed's Knowledge Check 6

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

A package containing an amount of Mercury compounds, solids, n.o.s., UN2025, PGIII, requiring hazard labels can be labeled with all but one of these labels. Which of these labels is NOT authorized to be used?

A.

B.

C.

D.

22

You must mark each package containing a Class 1, explosive material with the EX-number for that substance, article or device. Except for fireworks, a package of Class 1 materials may be marked with a national stock number issued by the Department of Defense or identifying information, such as a product code, in lieu of the EX-number, if the national stock number or identifying information can be specifically associated with the EX- number assigned.

When more than five different Class 1 explosive materials are packed in the same package, you may mark it with only five of the EX-numbers, national stock numbers, or product codes, or with a combination of each of these. This requirement does not apply if the EX-number, product code or national stock number of each explosive item described under a proper shipping description is shown in association with the shipping description required by the HMR. Product codes and national stock numbers must be traceable to the specific EX-number assigned by the Associate Administrator. Certain exception to these restrictions apply for material being shipped to testing agencies, or being used for developmental testing, or covered by a national security classification.

23

You must mark a bulk packaging that contains a marine pollutant with the MARINE POLLUTANT mark on at least two opposing sides or two ends other than the bottom, if the packaging has a capacity of less than 3,785 L. The mark must appear on each end and each side if the packaging has a capacity of 3,785 L or more. You must mark a transport vehicle or freight container that contains a package subject to these marking requirements with the MARINE POLLUTANT mark, on each side and each end. This requirement may be met by the marking displayed on a freight container or portable tank loaded on a motor vehicle or rail car. You do not have to mark non-bulk packagings containing marine pollutants with the Marine Pollutant mark, unless they are transported by vessel.

24

Professor Fed's Knowledge Check 7

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

The Marine Pollutant mark is NOT required to be affixed to which one of these packagings?

A. On a combination packaging containing 300 grams of Copper cyanide in an inner packaging.
B. On a combination packaging containing 5.5 kg of Dipentene in an inner packaging prepared for shipment overseas via vessel transportation.
C. On a portable tank containing Chlorine being prepared for shipment overseas via vessel transportation.
D. On a freight container containing a quantity of Nickel cyanide in excess of 5,000 kg, being loaded for vessel transport.

25

BIOHAZARD marking on two opposing sides or two ends other than the bottom, if the packaging has a capacity of less than 3,785 L. You must mark it on each end and each side if it has a capacity of 3,785 L or more. You must mark a transport vehicle or freight container bearing such packagings, if the BIOHAZARD marking on the bulk packaging is not visible, on each side and each end. The BIOHAZARD marking must be displayed on a background of contrasting color. It may be displayed on a plain white square-on-point configuration having the same outside dimensions as a placard. The BIOHAZARD marking must be visible from the direction it faces.

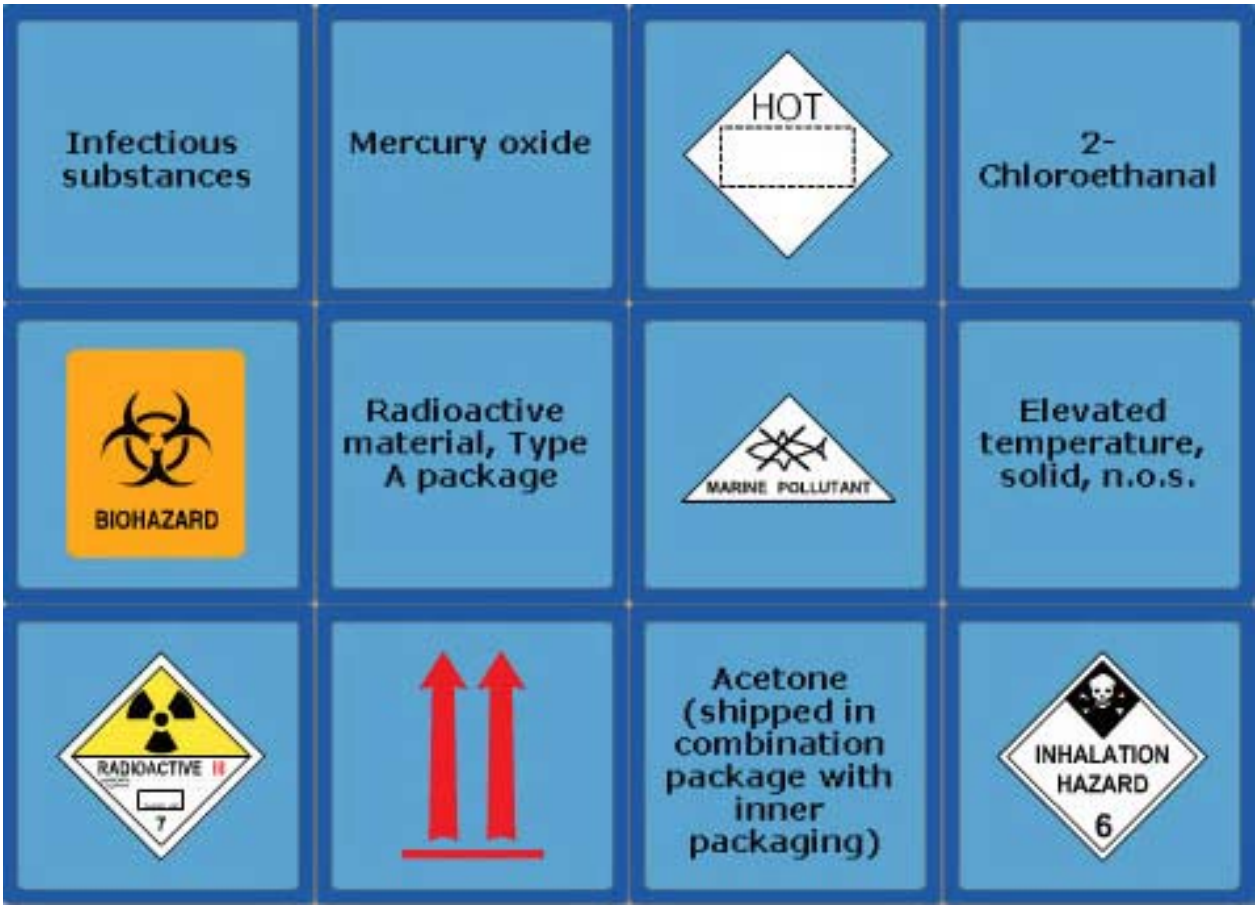
26

You must mark a bulk packaging containing an elevated temperature material on two opposing sides with the word ‘‘HOT,’’ in black or white Gothic lettering, on a contrasting background. The marking must be displayed on the packaging itself or in black lettering on a plain white square-on-point configuration having the same outside dimensions as a placard. You must mark bulk packagings containing molten aluminum or molten sulfur ‘‘MOLTEN ALUMINUM’’ or ‘‘MOLTEN SULFUR’’, respectively. If the identification number is displayed on a white-square-on-point display configuration, the word ‘‘HOT’’ may appear in the upper corner.

27

Professor Fed's Knowledge Check 8

Instructions: Complete this Knowledge Check by matching the shipping name with the hazard label or special marking required. Assume that quantity and transportation mode requirements have been met. You may select either the shipping name or the hazard label / special marking first. You will have two chances to correctly complete this exercise.



28

In addition to the general marking requirements previously addressed and the marking requirements for content-specific materials, it is important that you are familiar with the marking requirements for these bulk packaging types. Select each button to learn more about the marking requirements for each of these bulk-package types

29

In addition to the general and content-specific marking requirements, these markings are required when portable tanks are used. You must legibly mark the proper shipping name on a portable tank containing a hazardous material. You must mark the owner's or the lessee's name on a portable tank that contains a hazardous material. If the Identification number for the hazardous material contained in the portable tank is not visible from outside the transport vehicle, you must display it on each side and each end of the transport vehicle or freight container using placards, orange panels, or the white square-on-point configuration, as appropriate.

30

In addition to the general and content-specific marking requirements, these markings are required when cargo tanks are used. Select each button to learn more about the marking requirements for cargo tanks.

30a

Except for certain nurse tanks which must be marked as specified in §173.315(m), you must mark each cargo tank transporting a Class 2 material subject to the HMR, on each side and each end, with either the proper shipping name of the gas or an appropriate common name for the material (e.g., ‘‘Refrigerant Gas’’).

30b

Unless a cargo tank is already marked with the required identification number(s), the offeror must provide the number(s) to the carrier, or affix the number(s). If you offer a hazardous material or a cargo tank containing a hazardous material to a motor carrier for transportation, you must provide the motor carrier with the identification number(s) on placards, or affix orange panels containing the required identification number(s), prior to or at the time the material is offered for transportation. For a cargo tank transported on or in a transport vehicle or a freight container, if the identification number marking on the cargo tank would not normally be visible during transportation, the vehicle or container must be marked on each side and each end with the appropriate identification number.

31c

You must mark each MC 330 and MC 331 cargo tank, near the specification plate, with either ‘‘QT’’ (for cargo tanks made of quenched and tempered steel) or ‘‘NQT’’ (for cargo tanks not made of quenched and tempered steel.)

30d

Each on-vehicle manually-activated remote shutoff device for closure of the internal self-closing stop valve, must be identified by the marking ‘‘Emergency Shutoff,’’ in letters at least 0.75 inches in height, in a color that contrasts with its background, in an area immediately adjacent to the means of closure.

31

If you offer for transportation or transport a hazardous material in a tank car or multi-unit tank car tank, you must mark each side and each end with the material’s identification number. Similarly, a motor vehicle or rail car used to transport a multi-unit tank car tank containing a hazardous material must be marked on each side and each end with the material’s identification number.

In addition, a tank car containing certain ingredients must be marked on each side with the key words of the ingredient’s proper shipping name as specified in the HMT, or a common name authorized elsewhere in the HMR (e.g., “refrigerant gas”). Press “More” for a list of these ingredients.

31a

32

If you offer a hazardous material to a motor carrier for transportation in a bulk packaging, you must provide the motor carrier with the required identification numbers on placards or plain white square-on-point display configurations, or affix orange panels containing the numbers to the packaging. You must do this prior to or at the time the material is offered for transportation, unless the packaging is already marked with the identification number. For a bulk packaging contained in or on a transport vehicle or freight container, if the identification number marking on the bulk packaging is not visible, you must mark the transport vehicle or freight container on each side and each end with the material's identification number.

33

Professor Fed's Knowledge Check 9

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Which bulk packaging type requires QT and NQT markings near the specification plate to indicate if it is constructed of quenched and tempered steel or not?

A. Portable tanks
B. Cargo tanks
C. Tank cars and multi-unit tank car tanks
D. Other types of bulk packagings

34

You must display identification number markings on orange panels, placards, or white square-on-point configurations. For design specifications of each marking, see §172.332. To view all of these markings, use the DOT Chart 12 reference link below.

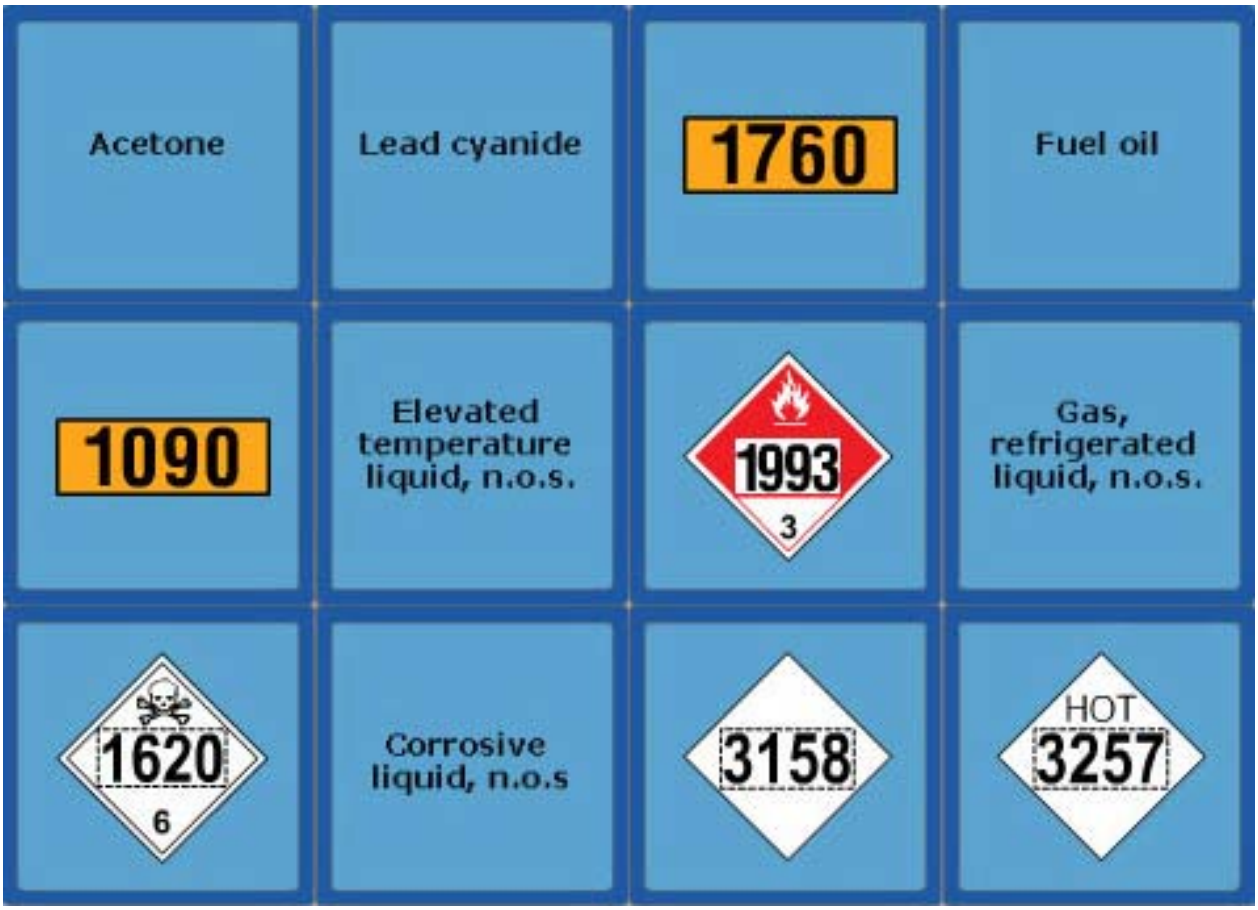
35

You may not display an identification number on a placard, orange panel, or white square-on-point display configuration unless the identification number is the one specified for the material in the HMT; and the package, freight container, or transport vehicle on which the number is displayed contains the hazardous material associated with that identification number. You may not display an identification number on an orange panel on a cargo tank unless it is affixed to the cargo tank by the person offering the hazardous material for transportation in the cargo tank. If a placard is required by the placarding tables, you may only display an identification number on an orange panel if it is displayed in proximity to that placard. You may not display an identification number on any Dangerous, Explosives, Radioactive, or Subsidiary Hazard placards.

36

Professor Fed's Knowledge Check 10

Instructions: Match the shipping name with the acceptable identification number panel, placard, or white square-on-point display configuration for the hazardous material shown. You may select either the shipping name or the identification number first. You will have two chances to correctly complete this exercise.



37

Identification numbers are not required on the ends of a portable tank, cargo tank or tank car having more than one compartment if hazardous materials having different identification numbers are being transported. In such a situation, the identification numbers on the sides of the tank shall be displayed in the same sequence as the compartments containing the materials they identify. On a cargo tank containing only gasoline, if the cargo tank is marked "Gasoline". On a cargo tank containing only fuel oil, if the cargo tank is marked "Fuel Oil". For each of the different liquid petroleum distillate fuels, including gasoline and gasohol in a compartmented cargo tank or tank car, if the identification number is displayed for the distillate fuel having the lowest flash point. For each of the different liquid petroleum distillate fuels, including gasoline and gasohol transported in a cargo tank, if the identification number is displayed for the liquid petroleum distillate fuel having the lowest flash point. On nurse tanks transporting anhydrous ammonia, and operated by a private carrier exclusively for agricultural purposes, when valves, fittings, regulators or gauges prevent the markings and placard from being properly placed and visible.

38

If more than one of the required identification number markings on placards, orange panels, or white square-on-point display configurations are damaged or destroyed during transportation, you must replace all the missing or damaged identification numbers as soon as practicable. In certain cases, however, you may legibly enter the correct identification numbers by hand, using an indelible marking material. When entered by hand, the identification numbers must be located in the white display area of the placard, orange panel or white square-on-point display.

39

Professor Fed's Knowledge Check 11

Instructions: Click and drag the response to the blank line that correctly completes the statement. Each response may only be used once.

Gasoline	highway	Kerosene	rail
white	one	primary	Poisonous
	red	subsidiary	

1. An identification number may be displayed only on a placard corresponding to the _____ hazard class of the hazardous material.

2. For a Combustible placard used to display an identification number, the entire background below the white background for the ID number must be _____ during transportation by _____.

3. The identification number 1203 is not required to be displayed on a cargo tank containing only this material, if the cargo tank is marked with the name of this material on each side and rear. What is the name of this material? _____

4. If more than _____ of the identification number markings on placards, orange panels, or white square-on-point display configurations are lost, damaged, or destroyed during transportation, the carrier shall replace all the missing or damaged identification numbers as soon as practicable.

41

You must label hazardous material if it meets one or more hazard class definitions, in accordance with column 6 of the HMT and the table found in §172.400(b). If you offer for transportation or transport a hazardous material in commerce, in any of the following packages or containment devices, you must label them. These packages and containment devices include:

- A non-bulk package;
- A bulk packaging, other than a cargo tank, portable tank, or tank car, with a volumetric capacity of less than 18 cubic meters (640 cubic feet);
- A portable tank of less than 3,785 liters capacity;
- A DOT Specification 106 or 110 multi-unit tank car tank; and
- An overpack, freight container or unit load device, of less than 18 cubic meters containing a package for which labels are required.

42

Certain classes or groups of hazardous materials, small or limited quantities, or special situations based upon the type of container, the shipper, or the circumstances are allowed exceptions to the labeling provisions specified in §172.400.

These labeling exceptions include:

- A label is not required on a cylinder, or a Dewar flask containing a Division 2.1 or Division 2.2 gas that is not poisonous, carried by a private or contract motor carrier, not overpacked, and durably and legibly marked
- A package or unit of military explosives or ammunition shipped by or on behalf of the DOD when in a freight container load, carload or truckload shipments, if loaded and unloaded by the shipper or DOD;
- A package containing a hazardous material other than ammunition that is loaded and unloaded under the supervision of DOD personnel, and escorted by DOD personnel separate vehicle;
- A compressed gas cylinder permanently mounted in or on a transport vehicle;
- A freight container, aircraft unit load device or portable tank that is placarded in accordance with subpart F of the HMR or conforms to §172.512 (a)(3) or (b)(3);
- An overpack or unit load device in or on which labels representative of each hazardous material in the overpack or unit load device are visible;
- Finally a package of low specific activity radioactive material and surface contaminated objects.
- Certain exceptions to labeling requirements are provided for small quantities and limited quantities.
- A subsidiary hazard label is not required on a package containing a Class 8 (corrosive) material which has a subsidiary hazard of Division 6.1 (poisonous) if the toxicity of the material is based solely on the corrosive destruction of tissue rather than systemic poisoning.
- A package containing a poisonous by inhalation material in a closed transport vehicle or freight container may be excepted from the POISON INHALATION HAZARD or POISON GAS label or placard, under the conditions set forth in §171.12 and §171.12a.

43

Professor Fed's Knowledge Check 12

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Labeling is required for all but one of these packages or containment devices. Which one of these packages or containment devices does NOT require a hazard label?

A. A non-bulk package of Div. 4.1 flammable solid material.
B. A bulk packaging, other than a cargo tank, portable tank, or tank car, with a volumetric capacity of less than 18 cubic meters of a Div. 4.2 spontaneously combustible material.
C. A portable tank of less than 3,785 L capacity containing a Div 5.2 organic peroxide.
D. A freight container of more than 18 cubic meters containing a package for which labels are required, as long as the container is placarded.

44

You may not display hazard class labels which are not representative of the hazardous material or the hazards posed, or which incorporate label colors or designs which could be confused with or conflict with a label prescribed in the HMR. The labels required by the HMR are normally used for domestic shipments, but may sometimes be used for international shipments as well. Several international organizations prescribe labeling requirements that may be used in addition to or in place of the domestic labels. The two previous restrictions do **not** apply to packages labeled in conformance with the United Nations (UN) Recommendations; the International Maritime Dangerous Goods (IMDG) Code; the International Civil Aviation Organization (ICAO) Technical Instructions; or the Canadian Dangerous Goods (TDG) Regulations. The provisions of this section do **not** apply to a packaging that is unused or cleaned and purged of all residue, transported in a transport vehicle or freight container in such a manner that the packaging is not visible during transportation, and transported on a vehicle that is loaded by the shipper and unloaded by the shipper or consignee.

45

You must label each package containing a hazardous material with the primary and, if applicable, the subsidiary hazard label(s) specified in column 6 of the HMT. If more than one label code is listed in column 6, the first code listed indicates the primary hazard, and the others are subsidiary hazards. For those packages containing a hazardous material not in Class 1 or Class 2, the materials must be labeled with a subsidiary hazard label in accordance with the Subsidiary Hazard Labels table shown here.

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Professor Fed's Knowledge Check 13

Instructions: Match the hazardous material information with the proper hazard label. You may select either the shipping name or the hazard label first. You will have two chances to correctly complete this exercise.

48

You must display the appropriate hazard class or division number in the lower corner of both primary and subsidiary hazard label.

49

The proper label to affix to a package of Class 7 radioactive material is based on the transport index, or "TI," and the maximum radiation level at any point on the external surface of the package. If the radiation level and TI suggest different hazard warning labels, choose the label indicating the greater hazard level**.** RADIOACTIVE WHITE–I indicates the least severe hazard level, while RADIOACTIVE YELLOW–III indicates the most severe**.** Any package containing a highway route controlled quantity must always be labeled RADIOACTIVE YELLOW–III.

For example, a package with a transport index of 0.8 and a maximum surface radiation level of 60 millirems per hour would require which label? This is determined by first entering the table under the transport index column and then reading to the far right to see which of the label categories is indicated. If the measured TI is not greater than 0.05, the value is considered to be zero. Our transport index is 0.8, so a TI of 0.8 falls in the category of "More than 0 but not more than 1", which requires a RADIOACTIVE YELLOW-II label. Next look for the maximum surface radiation level of 60 millirem/hour. This value falls in the category of greater than 50 millirem/hour, but less than or equal to 200 millirem/hours, which requires a RADIOACTIVE YELLOW-III label. Since RADIOACTIVE YELLOW-III indicates the more severe radiation hazard, you would choose this label to affix to the radioactive package.

50

Professor Fed's Knowledge Check 14

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Which class 7 radioactive materials hazard class label should be affixed to a radioactive materials package with a TI of 0.06 and a maximum radiation level of 35 mrem/h?

A. RADIOACTIVE WHITE-I
B. RADIOACTIVE YELLOW-II
C. RADIOACTIVE YELLOW-III
D. RADIOACTIVE YELLOW-III under exclusive use provisions

51

When two or more compatible hazardous materials are packed in the same packaging, or within the same outside container or overpack, you must label the outside of the packaging, outside container, or overpack for each class of hazardous material contained within.

53

For Classes 1, 2, 3, 4, 5, 6, and 8, the text indicating a hazard, such as Flammable Liquid or Oxidizer is not required on a primary or subsidiary label. Displayed here are both versions of the hazard class labels, with and without the hazard text.

54

In most cases, you must affix each label required by the HMR to a surface of the package or containment device containing the hazardous material, or print the label directly on the package surface. You must locate the label on the same surface the proper shipping name appears on, and in close proximity to the proper shipping name, if the package is big enough, not too irregular, and not a compressed gas cylinder. If the surface of the package is too small, too irregular, or a cylinder for compressed gases, the label may be displayed on a tag attached to the package. You may not use a tag for a Class 7 radioactive material. Click the Exceptions button to learn more. Select the other buttons to learn more about the specifications that guide the placement of hazard class labels. To learn more about the specifications for label design, see §172.406.

54a

54b

54c

54d

54e

55

Professor Fed's Knowledge Check 15

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Affixing a hazard class label to a tag attached to the hazardous materials package is NOT permissible in which of these situations?

A. with a package of Mercury in a box less than 3 inches per side
B. with a package containing a radioactive material
C. with an irregular-shaped package of Fibers vegetables, dry
D. with a cylinder of compressed gas

56

Professor Fed's Knowledge Check 16

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

When displaying the primary and subsidiary hazard labels for Flammable liquids, toxic, n.o.s., 3, UN1992, PGII – How far apart may the Class 3 and Div. 6.1 labels be placed?

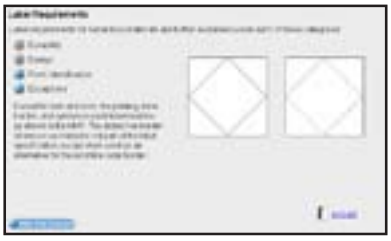
A. within 25 mm (1 inch) of one another
B. within 75 mm (3 inches) of one another
C. within 150 mm (6 inches) of one another
D. within 300 mm (12 inches) of one another

57

Label requirements for durability, design, form identification, and exceptions may be found in §172.407. Select each button to learn more about the requirements for hazardous materials labels.

57a

57b



57c

57d

59

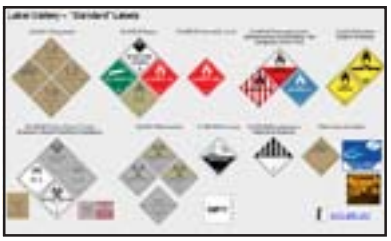
Professor Fed's Knowledge Check 17

Instructions: Select the best answer from the four choices provided. You will have two chances to answer this question correctly.

Except for hazardous materials that are _____, you may use a label conforming to the specifications in the UN Recommendations in place of a corresponding label that conforms to the requirements of the HMR.

A. corrosive
B. poisonous by inhalation
C. radioactive
D. spontaneously combustible

60



Now that you understand the general hazardous materials warning label requirements, let's turn our attention to what each of these hazardous materials warning labels look like and the specific requirements that exist for some labels. Just as the HMT lists a class or division for most hazardous materials, each class and/or division's warning labels are shown here: Class 1 explosives; Class 2 Gases; Class 3 Flammable Liquid; Class 4 Flammable Solids, Spontaneously Combustible, and Dangerous When Wet; Class 5 Oxidizer, and Organic Peroxide; Class 6 Poison/Toxic, Poison Inhalation Hazard, and Infectious Substances; Class 7 Radioactive; Class 8 Corrosive; Class 9 Miscellaneous Hazardous Material; Other Special Labels; In a moment, we'll look at labels for which special rules apply. First, let's look at "standard" labels, those you can use with just the information already presented. Click on any "standard" label here to view a full-size example. On the following screen we will explore those special hazardous materials warning labels for which special rules apply.

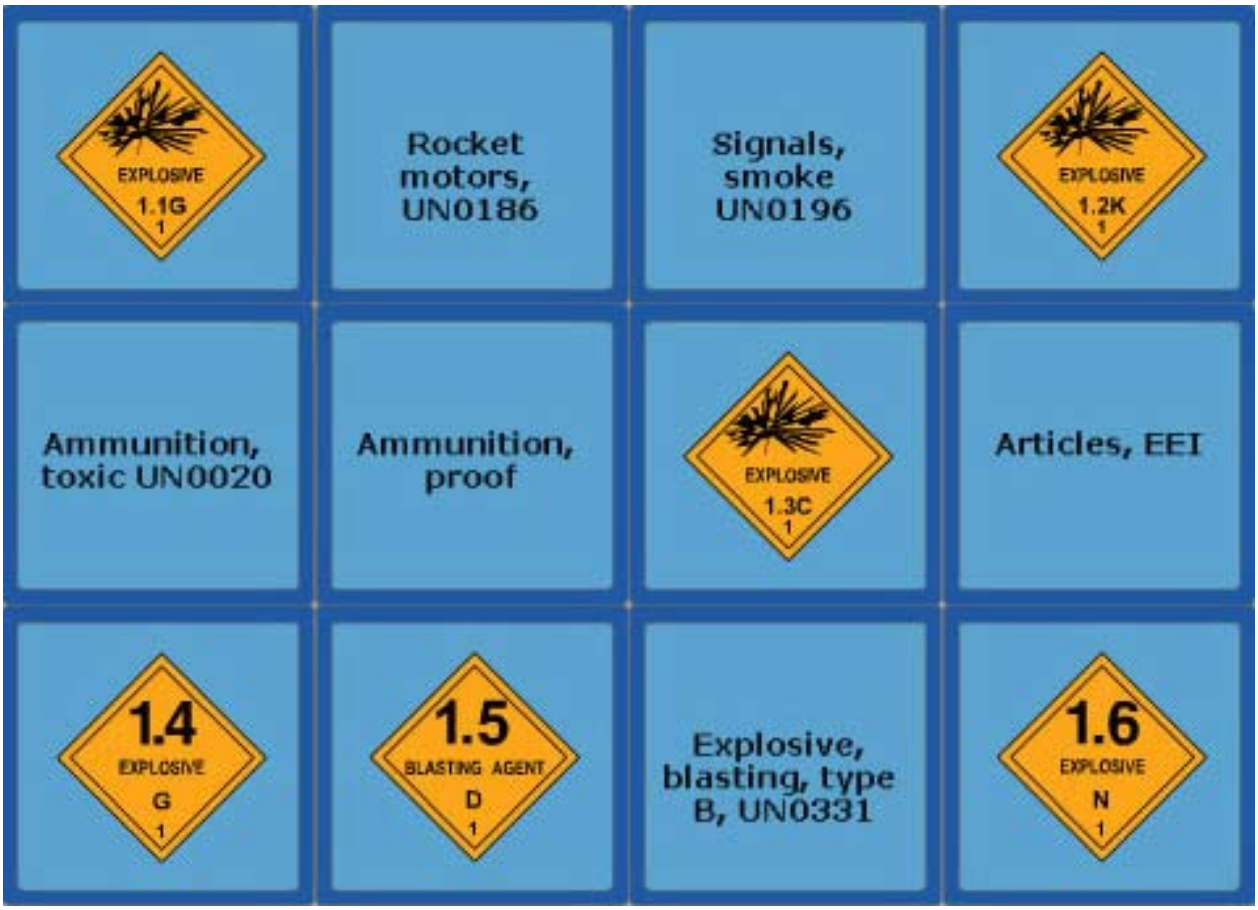
61

Now that you have viewed the standard hazardous materials warning labels, let's turn our attention to those warning labels with special cases that you need to become familiar with. You may click each of the marked labels to see a full-size example of that specific hazardous materials warning label and learn more about the specific rules that apply to that label. Along with each full-size label is a text description describing the special rules, and a reference for that label.

62

Professor Fed's Knowledge Check 18

Instructions: Match the shipping name with the proper hazard label. You may select either the shipping name or the hazard label first. You will have two chances to correctly complete this exercise.



63

Professor Fed's Knowledge Check 19

Instructions: Click and drag each name to fill in the blank lines above the hazard label. Select the hazard label that would correctly be affixed to a package or containment device containing a quantity of hazardous material with that shipping name. Each shipping name is used only once. You will have two chances to answer this exercise correctly. Select the Done button when you are finished to receive feedback.

Xenon Oxygen, compressed UN1072 Silane Sulfur dioxide

_____

_____

_____

_____

64

Professor Fed's Knowledge Check 20

Instructions: Match the shipping name with the proper hazard label that should be affixed to a package or containment device containing the hazardous material. You may select either the shipping name or the hazard label first. You will have two chances to correctly complete this exercise.

65

Professor Fed's Knowledge Check 21

IInstructions: Click and drag the shipping names to fill in the blank lines above the hazard labels, matching the correct hazard label to the hazardous material. Each shipping name is used only once. You will have two chances to answer this exercise correctly. Select the Done button when you are finished to receive feedback.

Potassium cyanide	Infectious substances UN2814
Acrolein, stabilized	Potassium arsenate

_____

_____

_____

_____

66

Professor Fed's Knowledge Check 22

Instructions: Click and drag the radioactive materials to fill in the blank lines above the hazard labels. Each radioactive material may be used only once. You will have two chances to answer this exercise correctly. Select the Done button when you are finished to receive feedback.

Cesium-137, TI = 0.8 and MSRL = 7 mrem/h

Chromium-49, TI = 0.03and MSRL = 0.5 mrem/h

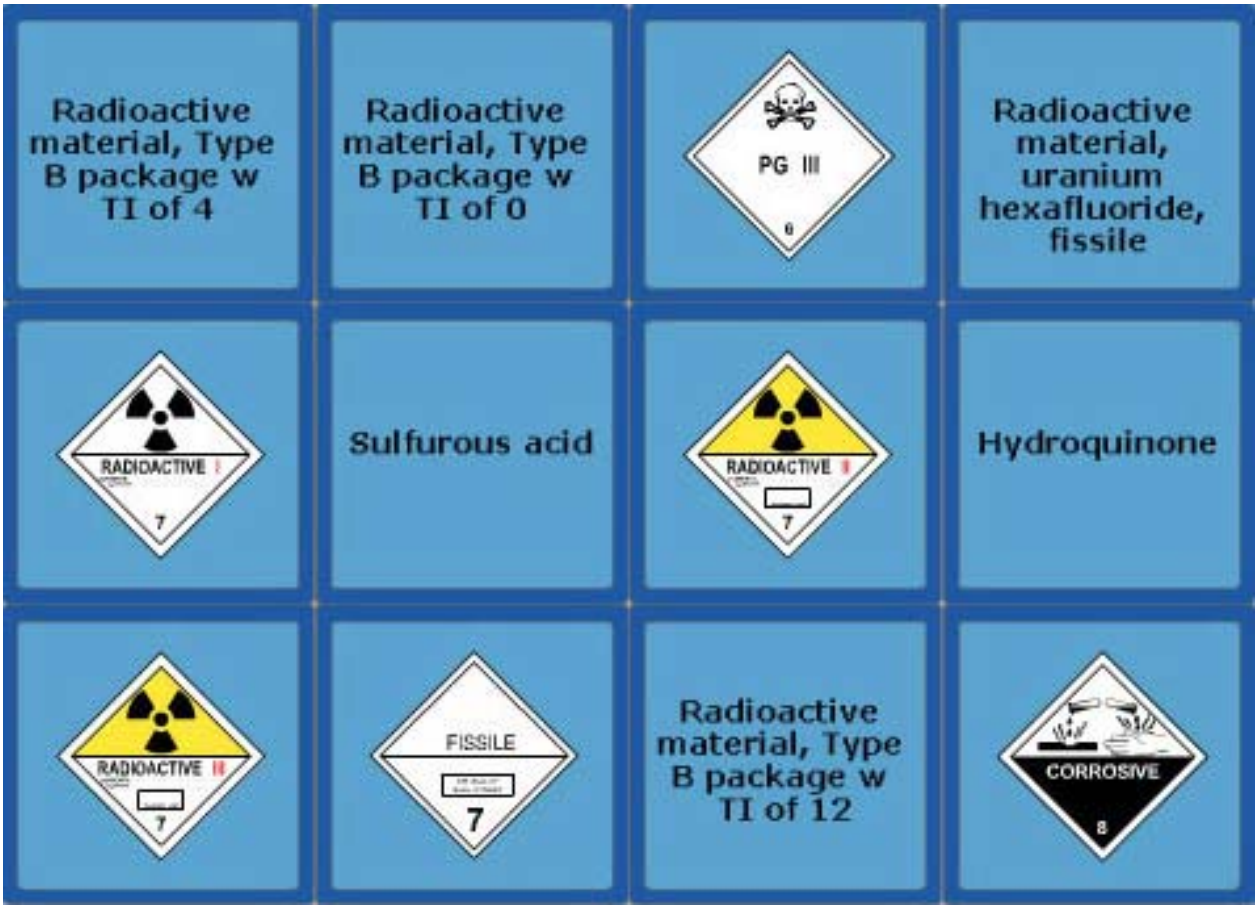
Radioactive material, fissile, n.o.s.

Iodine-125, TI = 7.5 and MSRL = 180 mrem/h

67

Professor Fed's Knowledge Check 23

Instructions: Match the shipping name with the correct hazard label. You may select either the shipping name or the hazard label first. You will have two chances to correctly complete this exercise.



68

Professor Fed's Knowledge Check 24

Instructions: Click and drag the shipping names to fill in the blank lines above the hazard labels. Select the correct hazard label for each shipping name. More than one hazard label may be required for an individual shipping name. You will have two chances to answer this exercise correctly. Select the Done button when you are finished to receive feedback.

Sodium hydroxide, solid Air bag inflators UN3268 Nitromethane (by air)

69

This concludes the instruction and Knowledge Checks for Module 3 – Marking and Labeling. Package markings inform transporters, emergency responders and others who come in contact with the package about the contents contained inside. Labels identify the hazard associated with the material being shipped and transported. Before you offer a shipment of hazardous material, be sure the packages are properly marked and labeled. If you are the carrier, know what you are accepting for transportation. If the hazardous material is not properly marked and labeled, or if the packages are not intact, do not accept the shipment. You should now be able to

- Apply the requirements for marking hazardous materials packages, freight containers, and transportation vehicles;
- Apply the requirements for labeling hazardous materials packages, overpacks, and freight containers;
- Identify special types of labeling that might be required for international shipments, water shipments, and air shipments.

It is now time to assess how well you understand the information presented in this module. When you are ready, select Test on the Express Lane, to begin the end of module test for Module 3. This will be an open reference test. Good luck.

End of Module Test

Now that you have completed reviewing Marking and Labeling, let's evaluate how well you have mastered this material. This end of module test contains twenty-five multiple-choice questions to determine your mastery of the three learning objectives covering Marking and Labeling. This is an open reference book test and you may use any of the references that you have to assist you in successfully completing this test.

Instructions: Select the best answer from the four choices provided.

Question #1

When two or more different primary and subsidiary hazard labels are required, they must be displayed _____.

A. next to each other, but not more than 6 inches apart
B. approx. 9-12 inches apart
C. one on each end of the package
D. as duplicate labels on at least two sides or two ends for every package

Question #2

Which of the following abbreviations may be used as part of a proper shipping description marking?

A. ammun.
B. blk. pwd.
C. cart.
D. ORM-D

Question #3

What is the primary hazard label listed in Column 6 of the HMT for Petroleum gases, liquefied?

A. Flammable Gas 2.1
B. Flammable Liquid 3
C. Non-Flammable Gas 2.2
D. Poison Gas 2.3

Question #4

A hazard label is NOT required for which of these types of package?

A. portable tank with a 900 gallon capacity, not previously placarded
B. compressed gas cylinder permanently mounted in or on a transport vehicle
C. DOT Specification 106 multi-unit tank car tank, not previously placarded
D. non-bulk package

Question #5

Marking refers to the placing of information on the outside of the hazardous materials packaging, to include such items as the _____.

A. proper shipping name of the hazardous material
B. identification number
C. orientation arrows, consignee's name or consignor's name
D. all of the above

Question #6

A package of hazardous material that meets the criteria of poisonous by inhalation must be marked _____.

A. Poison Hazard
B. Toxic Hazard
C. Inhalation Hazard
D. PGIII

Question #7

A non-bulk package containing a hazardous substance that meets or exceeds the reportable quantity per pack must be marked with the letters _____ on the package in association with the proper shipping name.

A. ORM
B. RQ
C. HM
D. HS

Question #8

A package containing which of these hazardous materials would require a primary hazard label of 'Dangerous When Wet'?

A. Isoheptenes
B. Phosphine
C. Rubidium
D. Stibine

Question #9

A 4.5-liter package of Methyl fluoride being transported via air transportation must contain which of these hazard labels?

A. Flammable Gas
B. Poison Inhalation Hazard
C. Poison Gas
D. Flammable Gas and Cargo Aircraft Only

Question #10

Required package markings for hazardous materials must be:

A. Unobscured by labels or attachments
B. Displayed on a similar colored background
C. Located adjacent to all of the other markings, so that everything is located together
D. Durable and printed in two languages

Question #11

Unless excepted, each package of hazardous material must be marked with:

A. Identification number
B. Label code
C. Proper shipping name
D. A. and C.

Question #12

Which one of these international bodies' regulations does not provide an acceptable alternative to the labeling requirements set forth in the HMR for domestic shipments of hazardous materials?

A. NATO Protocols on Overseas Shipping
B. United Nations Recommendations
C. Transportation of Dangerous Goods (TDG) Regulations
D. International Civil Aviation Organization (ICAO) Technical Instructions

Question #13

A Class 3, PGI substance that also meets the definition of a Class 8, PGII substance must be labeled _____.

A. FLAMMABLE and POISON
B. POISON LIQUID and CORROSIVE
C. FLAMMABLE LIQUID and CORROSIVE
D. COMBUSTIBLE LIQUID and POISON LIQUID

Question #14

A fiberboard box containing a 1.0 liter bottle of Dioxane must be marked with _____ on two opposite vertical sides of the package.

A. ORM-D marking
B. Package orientation arrows
C. Cargo Aircraft Only label
D. CORROSIVE label

Question #15

Identification numbers are permitted to be displayed on a placard with which of the following types of materials?

A. Radioactive
B. Corrosive
C. Explosive
D. Dangerous

Question #16

_____ refers to placing a warning notice specific to the hazard class and/or the handling precautions for the material on the outside of the shipping package or shipping container.

A. Packaging
B. Placarding
C. Labeling
D. Marking

Question #17

When is the Marine Pollutant marking required on a container?

A. On a non-bulk package containing a Marine Pollutant when being transported by vessel in association with the proper shipping name.
B. On a bulk package with a capacity of less than 1,000 gallons on opposing sides or ends of the container being shipped by vessel transport.
C. On a bulk container with a capacity greater than 1,000 gallons on all four sides being shipped by vessel transport.
D. All of the above require a Marine Pollutant marking

Question #18

A package of Arsine must be labeled with which labels?

A. POISON GAS and FLAMMABLE GAS
B. POISON GAS and OXIDIZER
C. POISON GAS and CORROSIVE
D. POISON INHALATION HAZARD and FLAMMABLE GAS

Question #19

The labels required by the HMR are normally used for domestic shipments, but may be used for international shipments in most cases. Several international organizations prescribe labeling requirements that may be used in addition to or in place of domestic labels. Which international organization conforms to the requirements for shipments of hazardous materials being transported from Canada?

A. International Civil Aviation Organization (ICAO)
B. Transportation of Dangerous Goods (TDG)
C. International Maritime Dangerous Goods (IMDG)
D. United Nations Recommendations

Question #20

When are package orientation arrows required as part of the labeling on a container?

A. On any package containing hazardous materials
B. On any non-bulk package containing hazardous materials
C. On any non-bulk container having inner packages that contain liquid hazardous materials
D. Arrows are not required on packages of hazardous materials

Question #21

Which package of hazardous material listed here must have this marking affixed to it if shipped by air transportation?

A. Compounds, cleaning liquid
B. Compressed gas, n.o.s.
C. Consumer commodity
D. Corrosive solids, n.o.s.

Question #22

Which of these labels is NOT an acceptable label for a package containing a quantity of Acrylamide?

A. Class 6, PGIII
B. POISON
C. POISON INHALATION HAZARD
D. TOXIC

Question #23

Which of these markings/placards is NOT acceptable for use on a bulk package of Petroleum gases, *liquefied*?

A.

C.

B.

D.

Question #24

Which of these materials would be required to display the identification number along with the proper shipping name on non-bulk packaging that only contained that single material?

A. Cartridges power devices
B. Furan
C. Consumer commodity
D. Acetone, Ltd Qty

Question #25

The A & Z Chemical Company of Grand Rapids, Michigan, is shipping to the Martin Fabricating Company of St. Louis, MO, 50 kg of Benzoyl chloride, a Class 8 material in a metal drum. The material is listed in Appendix A of the HMT as a hazardous substance. The shipment will be transported by highway and will be transferred from one motor carrier to a 2nd carrier. Which of these markings are NOT required on this container of Benzoyl chloride?

A. RQ, Benzoyl chloride

B. Benzoyl chloride

C. UN1736

D. A&Z Chemical Company, Grand Rapids, MI