# 2000 Edition

## Instructor Manual

# 6b Carrier Requirements (Air)

## HAZARDOUS MATERIALS TRANSPORTATION TRAINING MODULES

U.S. Department of Transportation
Research and Special Programs Administration

# Script

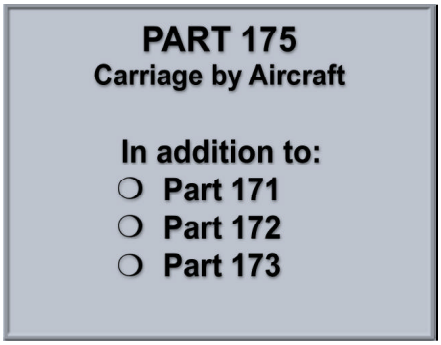
## Visual

## Narrative

### 1

Module 6B – Carriage by Aircraft. This module does not stand alone. Understanding the material in Modules 1 through 5 is a prerequisite for use of the following information.

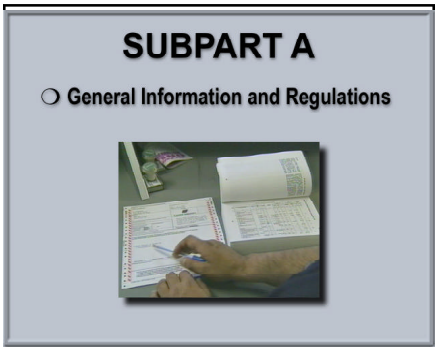
### 2




This module, Carrier Requirements , discusses the requirements for offering (as a shipper or passenger), accepting and/or transporting hazardous materials in commerce in any aircraft in the US and in all aircraft registered in the US, anywhere in the world. Part 175, Carriage by Aircraft, details the requirements for air transportation **in addition** to those contained in Parts 171, 172, and 173 of the HMR which were addressed in Modules 1 through 5. In addition to Part 175, we will review packaging requirements unique to air transportation.

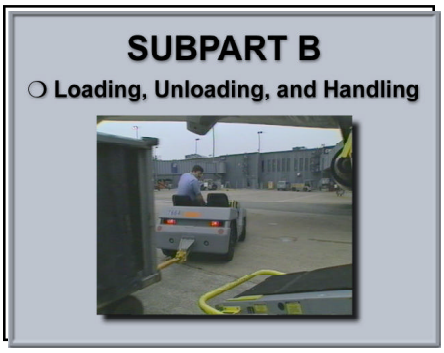
**175.1**

## 3



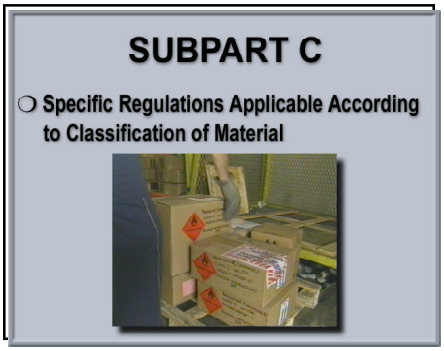

Part 175 is divided into Subparts A through C. Subpart A contains the air carrier requirements for inspecting and accepting hazardous materials shipments for air transport, documentation, training, and reporting of hazardous materials incidents or discrepancies.

## 4




Subpart B addresses air carrier requirements regarding loading, unloading, and handling of hazardous materials, including quantity limitations, stowage compatibility, cargo location and orientation of packages.

## 5




Subpart C contains special requirements for certain hazard classes and commodities such as flammable liquids, poisons, radioactive materials, and infectious substances.

## 6

All US air carriers and foreign air carriers operating flights to or from US airports must comply with the 49 CFR requirements governing the acceptance, storage, loading, and transportation of hazardous materials by air.
These requirements are in Subchapter C of 49 CFR (Parts 171-180).

**175.5**

### STUDENT RESPONSE NOTE 1-6

All US air carriers and foreign air carriers operating flights to or from US airports must comply with the 49 CFR, Part 175, requirements governing the acceptance, storage, loading, and transportation of hazardous materials by air.

## 7

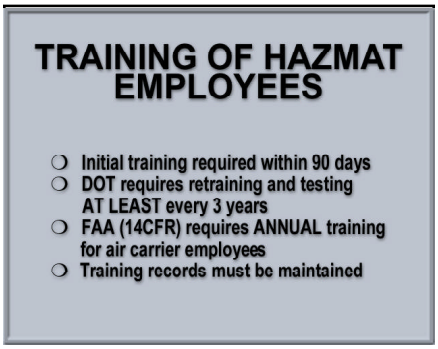
As an alternative to preparing shipments in accordance with 49 CFR, Parts 172 and 173, Section 171.11 of 49 CFR allows shipments to be prepared in accordance with the International Civil Aviation Organizations Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions). This facilitates both domestic and international transportation by air. However, Section 171.11 excepts these shipments only from the regulations for packaging, marking, labeling, classifying, and describing materials on shipping papers. All other requirements of Parts 171 through 180 must be met.

**171.11**

### STUDENT RESPONSE NOTE 7

Section 171.11 authorizes the use of the ICAO Technical Instructions for preparing hazardous materials shipments intended for transportation by air.

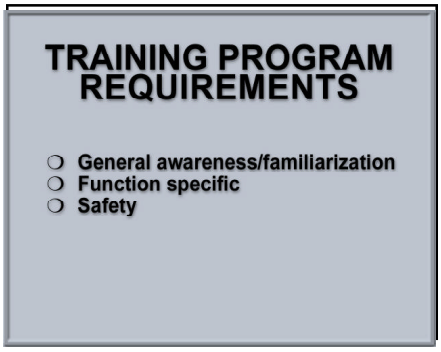
## 8




An air carrier to whom the HMR applies may not transport a hazardous material by aircraft unless each of its hazmat employees involved in that transportation has been trained and tested as required in 175.20 and 172.700-704. Initial training is required within 90 days for new employees or employees who assume new hazmat related responsibilities. DOT requires that hazmat employees be retrained and tested at least once every three years; however, the FAA, under 14 CFR, requires annual training for air carrier employees. Both, DOT and FAA, require the employer to maintain training records.

**14 CFR; 172.700; 175.20**

## 9




Training must include general awareness/familiarization, function-specific, and safety training. A person may not perform a hazmat function unless they have been trained in that function or, for a new employee or one who changes job functions, they work under the direct supervision of someone who is trained. If any regulatory requirements pertaining to a function the employee performs change, the employee must receive training concerning that function immediately.

**14 CFR; 172.700; 175.20**

### STUDENT RESPONSE NOTE 8-9

The air carrier is required to train <u>each</u> of its hazmat employees.

## SHIPMENT PREPARATION/ACCEPTANCE

## 10

The shipper and the air carrier share responsibility for the safe transportation of hazardous materials by air.

The air carrier relies on the shipper for compliance with the HMR based on the package markings and description on the shipping papers. Air carriers do not open packages or test contents of packages.

The air carrier must verify that the shipper has prepared the packages and shipping documents properly. Section 175.30 lists very specific items that must be checked before accepting hazardous material packages.

**175.30**

### STUDENT RESPONSE NOTE 10

The air carrier may not accept hazardous materials unless they verify that the shipper has properly prepared the packages and the shipping documents.

## SHIPPER RESPONSIBILITIES

**11**

In preparing a hazardous material for transportation by air, the shipper must:

- classify the hazardous material;
- determine if the material is regulated as a hazardous material for air transportation, and the quantities that are authorized;
- properly describe the hazardous material on the shipping documents;
- determine packaging requirements and package the material accordingly;
- mark and label the package to communicate the hazard of the material; and
- determine placarding requirements (if any).

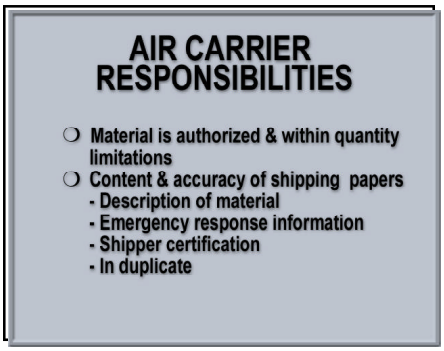
**173.22**

### STUDENT RESPONSE NOTE 11

The shipper must classify, describe, package, mark and label the hazardous materials.

## AIR CARRIER RESPONSIBILITY

**12**




The air carrier must verify:

- that the material, as described on the shipping papers, is authorized and is within the quantity limitations for passenger or cargo aircraft as specified in the HMT;
- the content and accuracy of the shipping papers;
  - Is the declaration and shipping description correct?
  - When required, does the shipping paper contain emergency response information?
  - Has the shipper certified that the shipment is in proper condition for transport by air?
  - Are two copies of the Shippers certification accompanying the shipment?

**171.11; 173.27(b)(4); 175.30(c)**

## 13

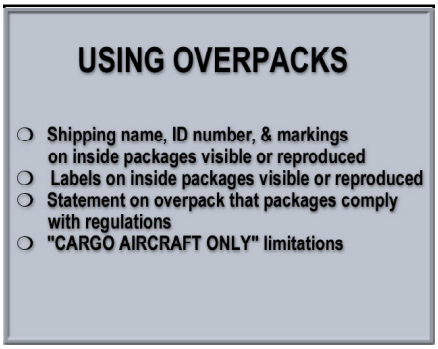
- that the hazardous materials are marked, labeled and, when required, placarded; package markings must correspond with the proper shipping name and ID number, as required, on the shipping documents.
- that material permitted on cargo aircraft, but not on passenger aircraft, is labeled with a Cargo Aircraft Only label;
- that the package is in good condition for air transportation: package integrity has not been compromised and is not leaking. Check that the seals on radioactive material packages have not been broken.

**171.11; 173.27(b)(4); 175.30(c)**

### STUDENT RESPONSE NOTE 12-13

An air carrier is required to make sure that the material, as described on the shipping papers and package markings, is authorized and is within the quantity limitations for carriage aboard an aircraft as specified in the HMT.

## 14




If the shipper used an overpack:

- the proper shipping name, ID number, and any special handling markings on the inside packages must be clearly visible or be reproduced on the outside of the overpack;
- all labels appearing on inside packages must be clearly visible or reproduced on the outside of the overpack;
- the overpack must display a statement that the inside packages comply with the prescribed specifications, when specific packaging is required;
- the overpack must not contain a package bearing the CARGO-AIRCRAFT-ONLY label unless:

1) the overpack affords clear visibility of and easy access to the package; or
2) the material in the package may be carried in an inaccessible location; or
3) only one package is overpacked.

**175.30(e)**

### STUDENT RESPONSE NOTE 14

If an overpack is used, verify that the proper shipping name, ID number, and any special handling markings and labels on the inside packages are clearly visible or that they are reproduced on the outside of the overpack.

## 15

If an air carrier employee finds that the shipper has not prepared the package properly, the air carrier must refuse the package.

**175.3**

### STUDENT RESPONSE NOTE 15

Improperly prepared packages must be refused.

## NOTIFICATION OF HAZMAT RESTRICTIONS

### 16

Air carriers that transport passengers must display signs warning passengers that the carriage of some hazardous materials aboard aircraft in their luggage or on their person is prohibited by Federal law. The signs must inform passengers of special exceptions that are permitted and penalties for failure to comply with the law. Signs must be legible, in English, and prominently displayed at ticket counters, baggage check locations and in aircraft boarding areas. These signs are available from the Research and Special Programs Administration and from the Federal Aviation Administration.

**175.25**

### 17

At cargo facilities, a similar sign must be displayed informing shippers of the requirements that apply to air shipments of hazardous materials and the penalties for failure to comply with those requirements.

**175.26**

**STUDENT RESPONSE NOTE 16-17**

Air carriers that transport passengers must display signs warning passengers that the carriage of some hazardous materials aboard aircraft in their luggage or on their person is prohibited by Federal law. At cargo facilities, a similar sign must be displayed.

## 18

Hazardous materials may not be carried in the cabin of a passenger aircraft or on the flight deck of any aircraft, except as authorized in 175.10. The list of exceptions, situations where the HMR do not apply, is quite long. For ease of comprehension, we have grouped the exceptions as follows:

**Hazardous Materials required for the safe operation of the aircraft;**

**Hazardous Materials intended for personal use by passengers and crewmembers;**

**Hazardous Materials intended for use in specialized air operations;**

**Hazardous Materials that must be carried to meet the medical needs of passengers or crewmembers; and**

**Miscellaneous hazardous materials exceptions.**

**175.10**

## 19

**Hazardous Materials required for the safe operation of the aircraft** include:

Aviation fuel and oil in tanks required to operate the aircraft, and

Hazardous materials required on board an aircraft to make the aircraft airworthy, e.g., fire extinguishers, oxygen generators, escape chutes, life rafts.

**175.10(a)(1-2)**

## 20

Replacements for such hazardous materials must be in compliance with the HMR.

- To ship aircraft spares and supplies, the shipper may use packaging specifically designed for these items if the packaging provides at least an equivalent level of protection to those required by 49 CFR.
- Aircraft batteries are not subject to the quantity limitations in 172.101 and 175.75(a).
- A serviceable tire in a tire assembly may not be inflated to a gauge pressure that exceeds the maximum rated pressure for that tire.

**175.10(a)(2)**

### STUDENT RESPONSE NOTE 18-20

Hazardous materials that are required to make the aircraft airworthy, such as aircraft batteries, escape chutes and fire extinguishers, are excepted from the HMR, but replacements for these hazardous materials are subject to the regulations.

## 21

**Hazardous Materials intended for personal use by passengers and crewmembers** include:

- Nonradioactive medicinal and toilet articles (including aerosols) may be carried by flight crew and passengers in checked or carry-on baggage. Other aerosols in Division 2.2 with no subsidiary risk, for personal use, may only be carried in checked baggage.
  - The aerosol containers may contain no more than 470 ml (16 ounces) or 2 kg (1.1 lbs) of material.
  - The total capacity of all the containers may not be more than 2 kgs (70 net weight ounces) or 2 liters (68 fluid ounces).
  - Personal smoking materials; but not lighters with flammable liquid reservoirs and containers with lighter fluid for refilling lighters. Strike anywhere matches are forbidden.
  - Butane curling irons, but not refills; the limit is one per person.

**175.10(a)**

## 22

- Small arms ammunition for personal use may be carried by a crewmember or passenger in checked baggage only. The ammunition must be securely packed in fiber, wood or metal boxes or containers specifically designed for that purpose.
- Duty free alcohol [not exceeding 70% alcohol (140 Proof), perfumes and colognes may be carried by passengers and crew in carry-on baggage.
- Dry ice used to cool perishables may be carried as cargo, and in checked and carry-on baggage. Quantities are limited to 2.3 kg (5 lbs.) in cargo and checked baggage, and 2 kg (4.4 lbs.) in carry-on baggage. The packaging must permit the release of carbon dioxide gas. For dry ice in checked baggage, the package must be marked with:
  - the name of the contents being cooled;
  - the net quantity of dry ice, and
  - the words Carbon Dioxide, Solid or Dry Ice.

**175.10(a)**

## 23

RSPA, in coordination with FAA, developed a brochure to inform the airline passengers regarding hazardous materials that are not permitted in checked and carry-on luggage. The brochure, “These Fly...These May Not” is available from RSPA’s Office of Hazardous Materials Initiatives and Training for distribution at ticket counters, curbside check-in, and aircraft boarding areas.

### STUDENT RESPONSE NOTE 21-23

Small quantities of certain personal toilet articles, smoking materials, medicines and dry ice are excepted from the HMR and may be carried on board an aircraft by passengers and crewmembers in their carry on baggage.

## 24

**Hazardous Materials intended for use in specialized air operations** include:

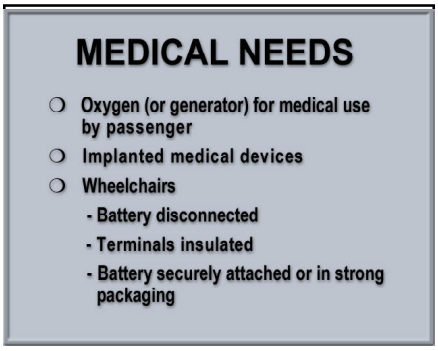
- Hazardous materials loaded and carried for purposes of aerial seeding, dusting, spraying, fertilizing, crop improvement or pest control;
- Smoke grenades and flares used in sport parachuting;
- Pyrotechnics used in air shows; and
- Hazardous materials expended during flight for weather control, environmental restoration and protection.

**175.10(a)**

### STUDENT RESPONSE NOTE 24

Hazardous materials used in specialized air operations, such as crop dusting, sport parachuting, and weather control, are generally not subject to the HMR.

## 25




**Hazardous Materials that must be carried to meet the medical needs of passengers or crewmembers** include:

- Oxygen, or any hazmat used to generate oxygen, for medical use by a passenger which is furnished by the air carrier;
- Implanted medical devices, such as a heart pacemaker;
- Wheelchairs and mobility devices may be accepted as checked baggage when:
  - the battery is disconnected and the terminals insulated;
  - the battery is securely attached to the wheelchair or is removed and packed in a strong rigid packaging, properly marked.

## 26

- For nonspillable batteries to be excepted from the Hazardous Materials Regulations,
  - the battery must be protected against short circuits and securely packaged;
  - for batteries manufactured after September 30, 1995, the battery and the outer packaging must be marked NONSPILLABLE or NONSPILLABLE BATTERY; and
  - the battery must be capable of passing the vibration and pressure differential test.

## 27

- Spillable batteries must be packed in leakproof packaging with enough absorbent material to absorb all of the battery contents. The package must be labeled Corrosive and marked Battery, wet, with wheelchair, and the Pilot in Command must be notified.

**173.159(d); 175.10(a)(19-20)**

**STUDENT RESPONSE NOTE 25-27**

Wheelchairs with either spillable or nonspillable batteries may be accepted as checked baggage. The battery must be disconnected and the terminals insulated.

## 28

The last group, **Miscellaneous hazardous materials exceptions,** includes:

- Carbon dioxide (solid), or Dry ice, used for food and beverage service aboard the aircraft;
- Alcohol, perfumes and colognes carried for sale on the aircraft;
- Small medical thermometer; and
- Weather agency barometer.

**175.10(a)(13)(15)(22)(26)**

### STUDENT RESPONSE NOTE 28

Dry ice used by the air carrier for in-flight food and beverage service is not subject to the HMR.

## 29

***Passenger-carrying aircraft or passenger aircraft:*** An aircraft that carries any person other than a crewmember, company employee, an authorized representative of the United States, or a person accompanying a shipment.

**171.8**

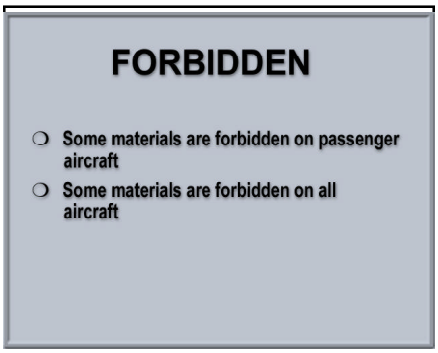
## 30

***Cargo aircraft:*** An aircraft that is used to transport cargo and is not engaged in carrying passengers. The terms cargo aircraft, cargo-only aircraft, and cargo aircraft only have the same meaning in this module.

**171.8**

We will use the terms passenger aircraft and cargo aircraft in this module.

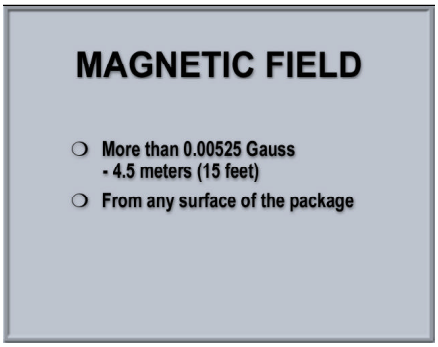
## 31




***FORBIDDEN:*** Some hazardous materials are FORBIDDEN from being transported; some materials are forbidden on passenger aircraft; some are forbidden on all aircraft. FORBIDDEN does not mean the material is not regulated.

**172.101(d); 173.27(b)(1-2)**

## 32



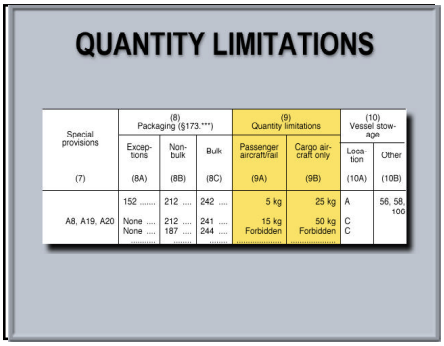

A package with a magnetic field of more than 0.00525 gauss measured 4.5 m (15 feet) from any surface of the package is forbidden to be carried on an aircraft.

**173.21(d)**

**STUDENT RESPONSE NOTE 29-32**

FORBIDDEN means that the material may not be transported. Some materials are only forbidden on passenger aircraft. Some are forbidden on all aircraft.

## 33




Column 9 of the Hazardous Materials Tables is entitled Quantity Limitations and forbids or limits the quantity of hazardous materials in one package that may be offered or transported by aircraft. Unless otherwise specified, the quantity limits are net quantity limits. That is, the total weight of the hazardous material, not including the weight of the package. The maximum net quantity permitted on a passenger aircraft is found in Column 9A; the maximum net quantity for a cargo only aircraft is in Column 9B.

**172.101(j); 173.27(b)(3)**

### STUDENT RESPONSE NOTE 33

Column 9 of the HMT limits or forbids offering or transporting of hazardous materials on passenger aircraft or cargo only aircraft.

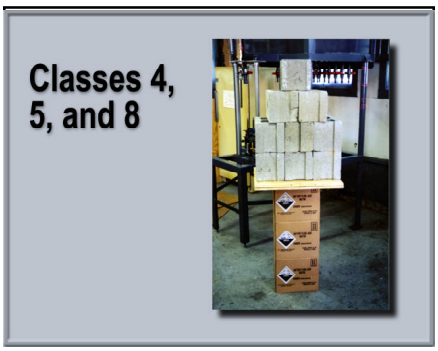
## PACKAGING

## 34

Unless otherwise noted, all packaging for hazardous materials must be designed, constructed and maintained to prevent the release of the hazardous materials. Proper packaging is critical to the safe transportation of hazardous materials, especially in air transportation where the hazardous material is subjected to changes in temperature, altitude and pressure. Packages offered or intended for air transportation must comply with the general packaging requirements in 173.24, 173.24a and 173.27.

**173.24; 173.24a; 173.27**

## 35




Packages containing Class 4, 5 and 8 materials must meet the performance tests at the Packing Group II level, even if Col. 5 of the HMT shows that the material is in Packing Group III.

**173.27(a)**

## 36

Packaging must be designed and constructed to prevent leakage that may be caused by internal pressure changes in altitude and temperature during air transportation.

**173.27(c)(1)**

## 37

Packaging designed for liquid hazardous materials must be capable of withstanding without leakage the greater of:

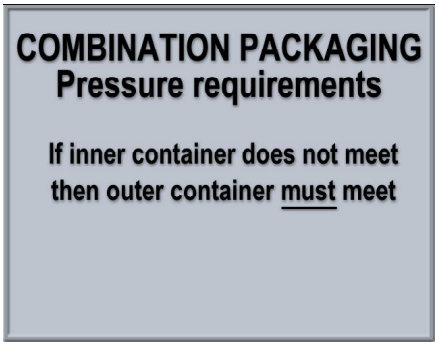
- an internal pressure which produces a gauge pressure of not less than 75 kPa (11 psi) for liquids in Packing Group III of Class 3 or Division 6.1 or 95 kPa (14 psi) for other liquids; or
- a pressure related to the vapor pressure of the liquid to be conveyed, determined by one of the following:
  - The total gauge pressure measured in the receptacle at 55°C (131°F), multiplied by a safety factor of 1.5; determined on the basis of a filling temperature of 15°C (59°F) and a degree of filling such that the receptacle is not completely liquid full at a temperature of 55°C (131°F) or less;
  - 1.75 times the vapor pressure at 50°C (122°F) less 100 kPa (15 psi); or
  - 1.5 times the vapor pressure at 55°C (131°F) less 100 kPa (15 psi).

**173.27(c)(2)(i)**

### STUDENT RESPONSE NOTE 34-37

Hazardous material packaging for air shipment must be designed and constructed to prevent leakage caused by altitude and temperature changes during air transportation.

## 38

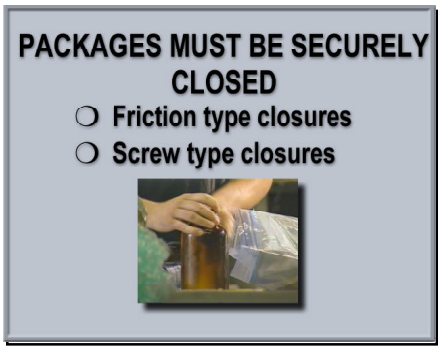



Hazardous materials, packed in combination packaging, may be enclosed in an inner container which does not meet the pressure requirements, provided it is packed inside a supplementary packaging that meets the pressure requirements.

Packagings which are subject to the hydrostatic pressure test and marking requirements must have a marked test pressure of not less than 250 kPa (36 psi) for liquids in Packing Group I, 80 kPa (12 psi) for liquids in Packing Group III of Class 3 or Division 6.1, and 100 kPa (15 psi) for other liquids.

**173.27(c)(3)**

## 39




Packages must be securely closed. Friction type closures, such as stoppers and corks, must be held securely in place by positive means. Screw type closures must be secured to prevent loosening from vibration or substantial changes in temperature or pressure.

**173.27(d)**

### STUDENT RESPONSE NOTE 38-39

Supplementary packaging that meets the pressure requirements, must be used in combination packaging if the inner container does not meet the pressure requirements. Package closures must be held securely in place to prevent leakage.

## 40

Combination packages of liquids in Packing Group I and II of Class 3, 4, 5, 6 and 8 require absorbent materials when the inner container is made of glass or earthenware. The absorbent material must be such that it does not react dangerously with the spilled liquid.

**173.27(e)**

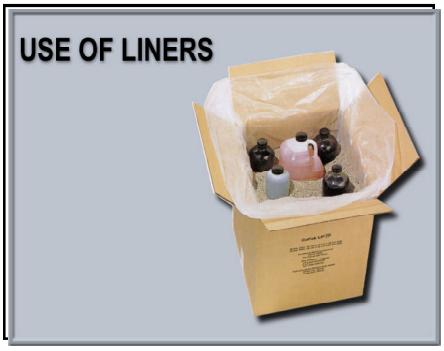
## 41

Absorbent material is not required for:

- inner packagings which are so protected that they will not break and leak under normal conditions of transportation, and leakage from the outer packaging is not likely to occur, and
- packagings of Packing Group II liquids intended for Cargo Aircraft Only.

**173.27(e)**

## 42




When absorbent material is required and the outer packaging is not liquid tight, some additional means of containing the spilled material must be used. This may be in the form of a leakproof liner, plastic bag or other means to stop leakage.

**173.27(e)**

## 43

When a liquid hazardous material in Packing Group I is being transported on a passenger aircraft, and the regulations require absorbent material, there must be sufficient material to absorb the contents of all inner packagings.

**173.27(e)(1)**

## 44

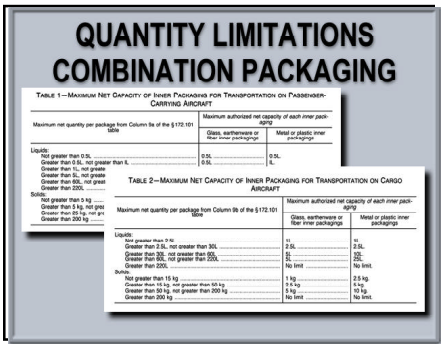
For Packing Group I liquids being offered for transport on a Cargo Aircraft Only, and Packing Group II liquids offered for passenger aircraft, there must be enough absorbent material in the package to absorb the content of any one of the inner containers. If the inner containers are different sizes, there must be enough material to absorb the content of the container with the greatest quantity of liquid.

**173.27(e)(2)**

### STUDENT RESPONSE NOTE 40-44

When absorbent material is required, the material must be such that it does not react dangerously with the spilled hazardous material. If absorbent material is required and the outer packaging is not liquid tight, some other means of containing the spilled material is required.

## 45



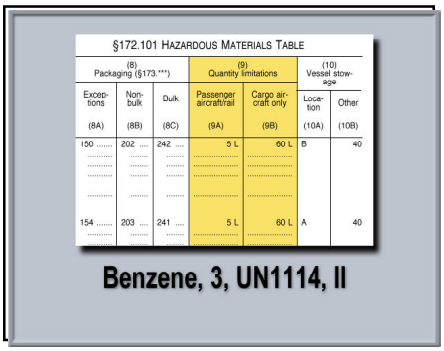

When combination packagings are being offered for air transport, the inner packaging must conform to the quantity limits set forth in 173.27(f), Tables 1 and 2. Table 1 indicates quantities permitted in inner containers for passenger aircraft and Table 2 for cargo aircraft.

**173.27(f)**

### Student Activity

Please locate and read 49 CFR 173.27(f), Tables 1 and 2.

## 46




To illustrate the use of Tables 1 and 2, look up Benzene in the HMT and note the allowed quantities in Columns 9A and 9B.

Benzene, 3, UN 1114, PG II is a flammable liquid and Column 9A of the HMT allows a maximum net quantity of 5L per package. Looking at Table 1, if Column 9A sets the maximum net quantity for a liquid material at 5L, the regulations permit a maximum of 1L in a glass, earthenware or fiber inner container, and 5L in a metal or plastic inner container.

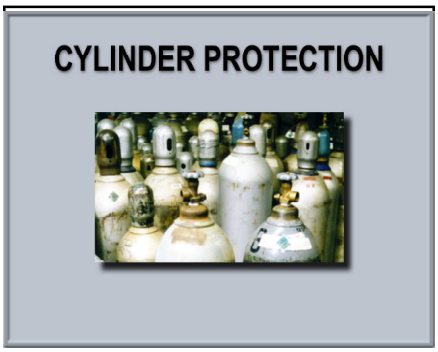
Column 9B allows a maximum of 60 L on cargo aircraft. Using Table 2, we see that we may have no more than 5 L in a glass, earthenware or fiber inner container, however, in a metal or plastic inner container we may put 10 L.

**173.27(f)**

### STUDENT RESPONSE NOTE 45-46

When combination packagings are being offered for air transport, the inner packaging must conform to the quantity limits set forth in 173.27(f), Tables 1 and 2.

## 47




Cylinder valves must be protected against damage and accidental opening when shipped by air. Valve caps must be securely attached or cylinders must be placed in a box or crate.

**173.27(g)**

### STUDENT RESPONSE NOTE 47

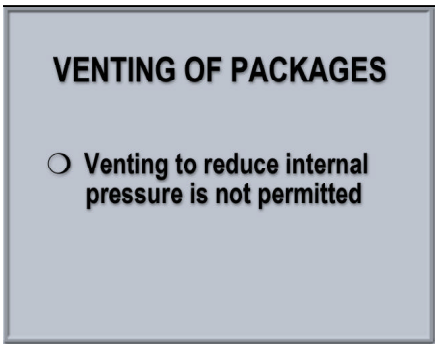
Cylinder valves must be protected when shipped by air. Equip cylinders with valve caps or protective headrings or put cylinders in a box or crate.

## 48

Tank cars and cargo tanks containing hazardous materials may not be transported aboard aircraft.

**173.27(h)**

## 49




Unless otherwise noted, venting of packages to reduce internal pressure is not permitted when packages are being transported by air.

**173.24(g)**

### STUDENT RESPONSE NOTE 48-49

No cargo tanks, tank cars or packages with vented closures may be transported aboard an aircraft.

## 50

Hazardous materials shipped by air and authorized for cargo aircraft only must have the CARGO AIRCRAFT ONLY label affixed to the package. The label warns those who handle the shipment that it may not be offered or transported on a passenger aircraft.

**173.27(b)(4);172.402(c)**

### STUDENT RESPONSE NOTE 50

CARGO AIRCRAFT ONLY labeled packages are prohibited from being offered or transported on passenger aircraft.

## 51

How much hazardous material may be carried aboard an aircraft?

Not more than 25 kg (55 lbs) net weight of hazardous material, and in addition 75 kg (165 lbs) net weight of Division 2.2 (non-flammable compressed gas) may be carried on a passenger aircraft in

- an inaccessible cargo compartment or
- in a freight container within an accessible cargo compartment.

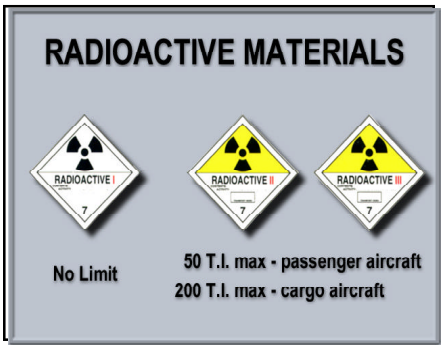
On a cargo aircraft, those same quantity limits apply to inaccessible cargo compartments and to accessible cargo compartments when the materials are not loaded in a freight container and are loaded in the cargo compartment in a manner that makes them inaccessible.

**175.75(a)(1-2)**

### STUDENT RESPONSE NOTE 51

Hazardous materials may be transported in an <u>inaccessible</u> cargo compartment or in a freight container within an accessible cargo compartment on passenger aircraft, if within specified weight limitations.

## 52




Radioactive materials are limited to 3.0 Transport Index (TI) per package or a total of 50.0 TI per passenger aircraft; the limits are 10.0 TI per package, with a maximum of 200.00 TI per cargo aircraft. Radioactive materials labeled RADIOACTIVE WHITE I are not subject to the TI limitations.

**175.75(a)(3)(i-ii)**

### STUDENT RESPONSE NOTE 52

Up to <u>3.0</u> TI per package of Radioactive Materials, but not more than 50.0 TI may be transported on a passenger aircraft.

## 53

There are no limits for Class 9 (Miscellaneous) materials, or ORM-D on either passenger or cargo aircraft.

**175.75(b)**

**STUDENT RESPONSE NOTE 53**

Unlimited quantities of Class 9 materials or ORM-D may be transported on either passenger or cargo aircraft.

## 54

Hazmat packages with text or arrows to indicate the proper orientation of the package must be stored and loaded in accordance with the markings.

**175.79(a)**

## 55

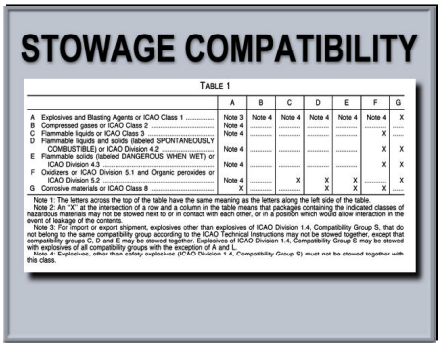
Packages must be secured in an aircraft so that movement of the package in flight is prevented.

**175.81**

## STUDENT RESPONSE NOTE 54-55

Arrows on packages indicate the orientation of the package. Packages containing hazardous materials must be prevented from movement in flight.

## 56




| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| A Explosives and Blasting Agents or ICAO Class 1 | Note 3 | Note 4 | Note 4 | Note 4 | Note 4 | Note 4 | X |
| B Compressed gases or ICAO Class 2 | Note 4 | ..... | ..... | ..... | ..... | ..... | ..... |
| C Flammable liquids or ICAO Class 3 | Note 4 | ..... | ..... | ..... | ..... | X | ..... |
| D Flammable liquids and solids (labeled SPONTANEOUSLY COMBUSTIBLE) or ICAO Division 4.2 | Note 4 | ..... | ..... | ..... | ..... | X | X |
| E Flammable solids (labeled DANGEROUS WHEN WET) or ICAO Division 4.3 | Note 4 | ..... | ..... | ..... | ..... | X | X |
| F Oxidizers or ICAO Division 5.1 and Organic peroxides or ICAO Division 5.2 | Note 4 | ..... | X | X | X | ..... | X |
| G Corrosive materials or ICAO Class 8 | X | ..... | ..... | X | X | X | ..... |

Note 1: The letters across the top of the table have the same meaning as the letters along the left side of the table.

Note 2: An "X" at the intersection of a row and a column in the table means that packages containing the indicated classes of hazardous materials may not be stowed next to or in contact with each other, or in a position which would allow interaction in the event of leakage of the contents.

Note 3: For import or export shipment, explosives other than explosives of ICAO Division 1.4, Compatibility Group S, that do not belong to the same compatibility group according to the ICAO Technical Instructions may not be stowed together, except that explosives of ICAO Division 1.4, Compatibility Group S may be stowed with explosives of ICAO Division 1.4, Compatibility Group E may be stowed with explosives of all compatibility groups with the exception of A and L.

Note 4: Explosives, other than safety explosives (ICAO Division 1.4, Compatibility Group S) must not be stowed together with this class.

Incompatible hazardous materials may not be placed next to each other or in a position that might lead to a dangerous interaction in the event the packages leak.

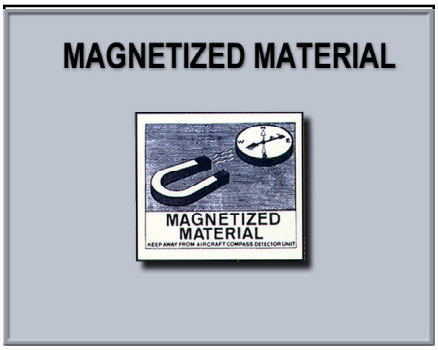
**175.78**

Please locate 175.78, Table 1.

The letters across the top of the table have the same meaning as the letters in the left hand column of the table. An "X" at the intersection of a row and a column means that these materials may react dangerously with each other and should not be placed next to each other in storage or on board the aircraft.

Please continue by reading Notes 3 and 4.

## 57



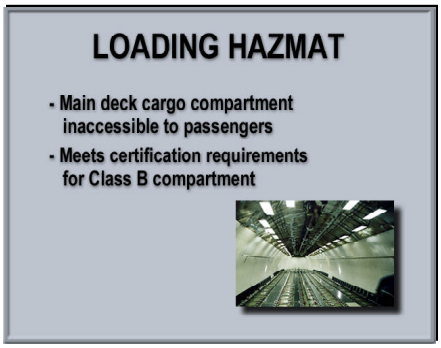

No person may load magnetized materials (which might cause an erroneous magnetic compass reading) on an aircraft, in the vicinity of a magnetic compass, or compass master unit, that is a part of the instrument equipment of the aircraft, in a manner that affects its operation. If this requirement cannot be met, a special aircraft swing and compass calibration may be made.

**175.85(g)**

## STUDENT RESPONSE 56-57

Materials that react dangerously with each other may not be stored or loaded next to each other.

## 58




On a passenger aircraft, hazardous materials may be carried in a main deck cargo compartment provided that the compartment is inaccessible to passengers and that it meets all certification requirements for a Class B aircraft cargo compartment [14CFR 25.857(b)].

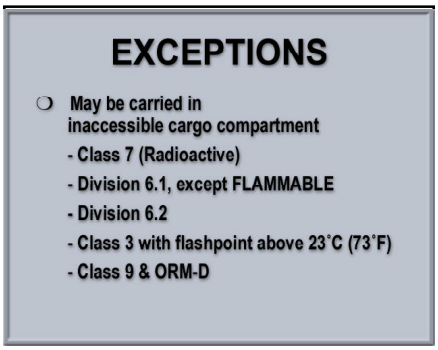
**175.85(a)**

## 59

Hazardous material acceptable only for cargo aircraft must be loaded in such a manner that a crew member or other authorized person can see, handle, and when size and weight permit, separate such packages from other cargo during flight.

**175.85(b)**

## 60




When packages in the following hazardous classes or divisions are carried on cargo aircraft, they may be carried in a location which is inaccessible to a crewmember during flight and are not subject to the weight limitation specified in 175.75(a)(2):

- Class 7 (radioactive) materials,
- Division 6.1 (poisonous/toxic) materials (except those labeled FLAMMABLE),
- Division 6.2 materials (etiologic or infectious substances),
- Class 3 (Flammable liquid) materials with a flashpoint above 23°C (73° F) that do not meet the definition of another hazardous class, and
- Class 9 (miscellaneous hazardous) materials, and ORM-D materials.

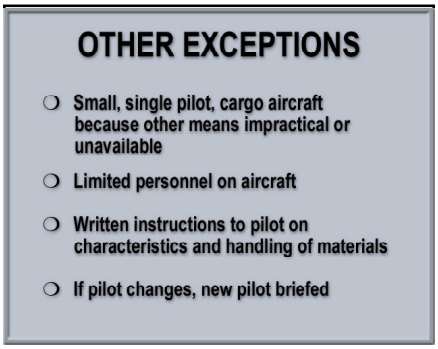
**175.85(c)(1)**

## 61

When packages of hazardous materials acceptable for cargo or passenger aircraft are carried on cargo aircraft only where other means of transportation are impracticable or not available, packages may be carried in accordance with procedures approved in writing by the FAA Air Transportation Security Field Office responsible for the operator's overall aviation security program or the FAA Air Transportation Security Division in the region where the operator is located.

**175.85(c)(2)**

## 62




When packages of hazardous materials acceptable for cargo or passenger aircraft are carried on small, single pilot, cargo aircraft only because other means of transportation are impracticable or not available, they may be carried without quantity limitation as specified in 175.75 in a location that is not accessible to the pilot if:

- no person other than the pilot, an FAA inspector, the shipper or consignee of the material or a representative of the shipper or consignee so designated in writing, or a person necessary for handling the material is carried on the aircraft;
- the pilot is provided with written instructions on characteristics and proper handling of the materials; and
- whenever a change of pilots occurs while the material is on board, the new pilot is briefed under a hand-to-hand signature service provided by the operator of the aircraft.

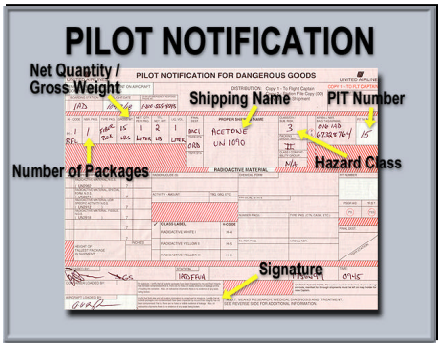
**175.85(c)(3)**

### STUDENT RESPONSE NOTE 58-62

Materials in Classes 3 (PGIII), 7, and 9, Divisions 6.1 and 6.2, and ORM-D may be carried on a cargo aircraft in a compartment that is inaccessible to crewmembers. These materials are not subject to the weight limitations in 175.75 (a)(2).

# PILOT NOTIFICATION

## 63




Before an aircraft departs, the pilot-in-command must be given written notification describing all hazardous materials that have been loaded. This does not apply to the exceptions listed in 175.10.

There is no standard format required for use by air carriers for pilot notification. The HMR generally requires the following information on the Notification to Pilot-in-Command:

- proper shipping name, hazard class or division, ID number;
- total number of packages;
- net quantity or gross weight;
- location of packages aboard the aircraft;
- confirmation that packages are not damaged or leaking.
- Other additional information may be required.

The notification to pilot-in-command must be readily available to the pilot during flight as it contains information that would be critical in the case of a spill or other emergency.

**175.33**

### STUDENT RESPONSE NOTE 63

The notification to pilot-in-command tells the pilot-in-command that hazardous materials are on board, what the hazardous materials are, how much was loaded and the location on the aircraft.

## REPORTING DISCREPANCIES AND INCIDENTS

### 64

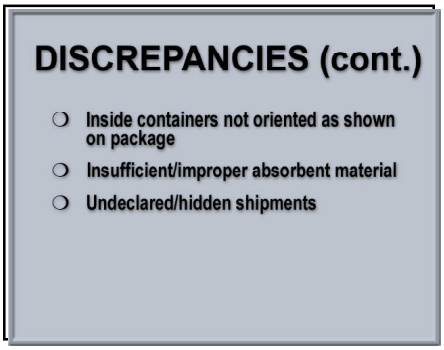
In addition to acceptance requirements, 49 CFR, Part 175, Subpart A contains requirements for reporting hazardous materials discrepancies.

Discrepancies are situations where hazardous materials are improperly described, certified, labeled, marked, or packaged in a manner which is not known at the time the air carrier accepts the shipment. Discrepancies which must be reported include:

- hazardous materials which are improperly described, certified, packaged, marked, or labeled;
- packages that exceed the authorized quantity limitations for air transportation;
- packages containing hazardous materials but the contents are not described or certified as hazardous materials on shipping papers;
- packages with unauthorized inside containers or improper closures;

**175.31**

### 65




- packages with inside containers not oriented as shown by package markings; and
- packages with insufficient or improper absorption materials, when required.
- packages or baggage which are determined to contain hazardous materials after they have been offered and accepted as nonhazardous materials by the carrier (i.e., hidden or undeclared shipments).

**175.31**

## 66

If a discrepancy is discovered after the shipment has been accepted, the air carrier must notify the nearest FAA Civil Aviation Security Office.

**175.31(a)**

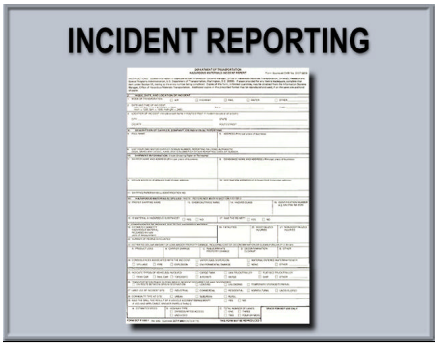
Please read the requirements in 175.31.

### STUDENT RESPONSE NOTE 64-66

A discrepancy is a situation in which a hazardous material is improperly described, certified, labeled, marked, or packaged in a manner which is not known when accepted by the air carrier. If a discrepancy is discovered after acceptance by the carrier, the air carrier must notify the nearest FAA Civil Aviation Security Office.

# INCIDENTS

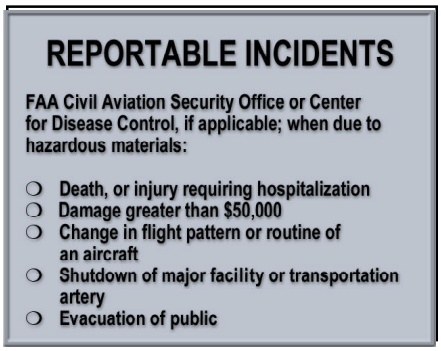
## 67




Despite all safety efforts, accidents and incidents do occur. When a hazardous material is involved in a transportation incident, a report may be required. Reporting requirements are the responsibility of the carrier.

**171.15**

## 68




Section 171.15 provides guidelines for incidents that require immediate notification. The immediate notification must be followed by a detailed written report to the US DOT as outlined in 171.16. Hazmat incidents that result in any of the following require notification as soon as possible to the nearest FAA Civil Aviation Security Office or the Center for Disease Control, if applicable, when due to the hazardous material:

- death or injury requiring hospitalization,
- damage greater than $50,000,
- change in the operational flight pattern or routine of an aircraft,
- shutdown of a major facility or transportation artery for more than one hour, or
- an evacuation of the general public that lasts more than one hour.

The telephone report must be followed by a written report within 30 days.

**171.15; 171.16**

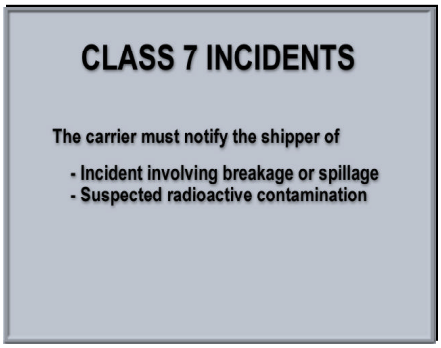
## 69

A written report is also required for any incident involving the release of a hazardous material, regardless of the seriousness of the incident.

**171.16**

Please read the reporting requirements in 171.15 and 171.16.

## 70




If an incident involves breakage, spillage, or suspected radioactive contamination from Class 7 (radioactive) materials shipments, the carrier shall also notify the shipper at the earliest practicable moment.

**173.422(b)(2); 175.700(b)**

### STUDENT RESPONSE NOTE 67-70

When a hazardous material is involved in a transportation incident, a report may be required. Reporting requirements are the responsibility of the carrier.

## 71

This concludes the instruction and practice portion of this module. Now is the time to assess how well the module taught you. This will be an open book test. There are no "trick" questions. Unless instructed otherwise, please complete the **Module 6B Test**. The **Module 6B Test** begins on page 36 of your Instructor Manual.

**Instructor Note:**
Please check test answers, record scores, and update training records. Review test results with students.

**STUDENT RESPONSE NOTE ANSWERS** begin on page 38.

**MODULE 6B TEST ANSWERS** begin on page 41.

# Module 6B Test

1. A shipper is offering a package containing 20 lbs. of Calcium nitrate for transportation by air. What is the maximum net quantity per package allowed on a passenger aircraft?

   a. 100 kg
   b. 25 lbs.
   c. 25 kg
   d. 75 lbs.

2. Identify the label(s) required for 20 lbs. of Calcium nitrate to be transported on a passenger aircraft.

   a. 5.1
   b. 6.1
   c. 1.1
   d. 2.1

3. A shipper is offering a package containing 75 kgs. of Calcium nitrate for transportation on a cargo aircraft. What is the maximum allowable net quantity per package?

   a. 25 kg
   b. 100 kg
   c. 100 lbs.
   d. 25 lbs.

4. Identify the label(s) required for the shipment in Question 3. (75 kg Calcium nitrate for transportation on a cargo aircraft.)

   a. 5.1
   b. 5.1 and Cargo Aircraft Only
   c. 8
   d. 5.1 and 4.3

5. How many copies of the Shippers certification must accompany the shipment?

   a. three
   b. one
   c. four
   d. two

6. The air carrier must verify that the shipper has properly prepared the packages as well as the shipping papers.

   a. True
   b. False

7. The air carrier must verify the markings on the package of Calcium nitrate. Identify the marking that is not required on a package.

   a. consignee or consignor
   b. hazard class
   c. proper shipping name
   d. ID number

8. Hazardous materials being transported as company replacement items must be marked, labeled, and documented in the same manner as a commercial air freight shipment, unless otherwise provided.

   a. True
   b. False

9. Orientation arrows indicate the proper orientation of packages for _____ and storing.

   a. loading
   b. filling
   c. marking
   d. labeling

10. Packages labeled Flammable Liquid and packages labeled Oxidizer may be stored and loaded next to each other.

    a. True
    b. False

11. All hazardous material shipments, unless excepted in 175.10, require the aircraft operator to complete a Notification to the Pilot in Command.

    a. True
    b. False

12. Identify the item of information not required on the notice to the pilot in command.

    a. description of the hazardous materials
    b. name of the shipper
    c. location of the hazardous materials loaded on the aircraft
    d. total number of packages

# Answer Sheets

## Student Response Note Answers

1-6 All US air carriers and foreign air carriers operating flights to or from US airports must comply with the 49 CFR, Part 175, requirements governing the acceptance, storage, loading, and transportation of hazardous materials by air.

7 Section 171.11 authorizes the use of the ICAO Technical Instructions for preparing hazardous materials shipments intended for transportation by air. It does not except these shipments from the requirements in Parts 171-180 49 CFR and additional requirements listed in 171.11.

8-9 The air carrier is required to train each of its hazmat employees.

10 The air carrier may not accept hazardous materials unless they verify that the shipper has properly prepared the packages and the shipping documents.

11 The shipper must classify, describe, package, mark and label the hazardous materials.

12-13 An air carrier is required to make sure that the material, as described on the shipping papers and package markings, is authorized and is within the quantity limitations for carriage aboard an aircraft as specified in the HMT.

14 If an overpack is used, verify that the proper shipping name, ID number, and any special handling markings and labels on the inside packages are clearly visible or that they are reproduced on the outside of the overpack.

15 Improperly prepared packages must be refused.

16-17 Air carriers that transport passengers must display signs warning passengers that the carriage of some hazardous materials aboard aircraft in their luggage or on their person is prohibited by Federal law. At cargo facilities, a similar sign must be displayed.

18-20 Hazardous materials that are required to make the aircraft airworthy, such as aircraft batteries, escape chutes and fire extinguishers, are excepted from the HMR, but replacements for these hazardous materials are subject to the regulations.

21-23 Small quantities of certain personal toilet articles, smoking materials, medicines and dry ice are excepted from the HMR and may be carried on board an aircraft by passengers and crewmembers in their carry on baggage.

24 Hazardous materials used in specialized air operations, such as crop dusting, sport parachuting, and weather control, are generally not subject to the HMR.

25-27 Wheelchairs with either spillable or nonspillable batteries may be accepted as checked baggage. The battery must be disconnected and the terminals insulated.

28 Dry ice used by the air carrier for in-flight food and beverage service is not subject to the HMR.

29-32 FORBIDDEN means that the material may not be transported. Some materials are only forbidden on passenger aircraft. Some are forbidden on all aircraft.

33 Column 9 of the HMT limits or forbids offering or transporting of hazardous materials on passenger aircraft or cargo only aircraft.

34-37 Hazardous material packaging for air shipment must be designed and constructed to prevent leakage caused by altitude and temperature changes during air transportation.

38-39 Supplementary packaging that meets the pressure requirements, must be used in combination packaging if the inner container does not meet the pressure requirements. Package closures must be held securely in place to prevent leakage.

40-44 When absorbent material is required, the material must be such that it does not react dangerously with the spilled hazardous material. If absorbent material is required and the outer packaging is not liquid tight, some other means of containing the spilled material is required.

45-46 When combination packagings are being offered for air transport, the inner packaging must conform to the quantity limits set forth in 173.27(f), Tables 1 and 2.

47 Cylinder valves must be protected when shipped by air. Equip cylinders with valve caps or protective headrings or put cylinders in a box or crate.

48-49 No cargo tanks, tank cars or packages with vented closures may be transported aboard an aircraft.

50 CARGO AIRCRAFT ONLY labeled packages are prohibited from being offered or transported on passenger aircraft.

51 Hazardous materials may be transported in an inaccessible cargo compartment or in a freight container within an accessible cargo compartment on passenger aircraft, if within specified weight limitations.

52 Up to 3.0 TI per package of Radioactive Materials, but not more than 50.0 TI may be transported on a passenger aircraft.

53 Unlimited quantities of Class 9 materials or ORM-D may be transported on either passenger or cargo aircraft.

54-55 Arrows on packages indicate the orientation of the package. Packages containing hazardous materials must be prevented from movement in flight.

56-57 Materials that react dangerously with each other may not be stored or loaded next to each other.

58-62 Materials in Classes 3 (PGIII), 7, and 9, Divisions 6.1 and 6.2, and ORM-D may be carried on a cargo aircraft in a compartment that is inaccessible to crewmembers. These materials are not subject to the weight limitations in 175.75 (a)(2).

63 The notification to pilot-in-command tells the pilot-in-command that hazardous materials are on board, what the hazardous materials are, how much was loaded and the location on the aircraft.

64-66 A discrepancy is a situation in which a hazardous material is improperly described, certified, labeled, marked, or packaged in a manner which is not known when accepted by the air carrier. If a discrepancy is discovered after acceptance by the carrier, the air carrier must notify the nearest FAA Civil Aviation Security Office.

67-70 When a hazardous material is involved in a transportation incident, a report may be required. Reporting requirements are the responsibility of the carrier.

# Module 6B Test Answers

| Question | Answer/Explanation | | 49 CFR Reference |
|---|---|---|---|
| 1. | c. | 25 kg | 172.101 |
| 2. | a. | 5.1 | 172.101 |
| 3. | b. | 100 kg | 172.101 |
| 4. | b. | 5.1 and Cargo Aircraft Only | 172.101 |
| 5. | d. | two | 172.204(c)(2) |
| 6. | a. | True | 175.30(a-b) |
| 7. | b. | hazard class | 175.30(a)(3) |
| 8. | a. | True | 175.10(a) |
| 9. | a. | loading | 175.79(a) |
| 10. | b. | False | 175.78(a) |
| 11. | a. | True | 175.33(a) |
| 12. | b. | name of the shipper | 175.33 |