

# **Module 3: Hazardous Materials and Terrorist Incidents**

## **Lesson 9: Hazardous Materials Safety**

### **Self-Study Guide**

## Lesson Overview

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**Lesson Purpose** Chemicals have become a part of daily life. They are used and stored in all types of locations and are transported by a variety of means. Most chemicals are safe when stored, used, and disposed of properly. When used improperly, spilled, or mixed, chemicals pose a health and environmental threat.

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**Lesson Objectives** After completing this lesson, you should be able to determine:

- When hazardous materials are present.
- What CERT members should do in situations involving hazardous materials.

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**Estimated Time** 20 minutes

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**Contents** This lesson includes the following sections:

- Lesson Overview
- Household Chemical Emergencies
- Identifying Stored Hazardous Materials
- Identifying Hazardous Materials in Transit
- Lesson Summary

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### Lesson Overview

Chemicals have become a part of everyday living. They make our lives easier in innumerable ways. But, following a disaster, the same chemicals can pose a real danger to CERT members because they are spilled or mixed with other chemicals.

### Hazards Chemicals can Pose

We use chemicals every day to clean our homes and to lubricate and power our machinery.

We've become so accustomed to using chemicals that we sometimes forget how dangerous they can be.

Chemicals that are not handled, stored, and disposed of properly create real hazards to people and animals, property, and the environment.

When CERT members respond following a disaster, the sizeup must determine whether hazardous materials are present.

What should you do if you suspect or encounter hazardous materials at an incident?

In this lesson, you'll learn how to identify hazardous materials in your home, in storage, and in transit and actions that you should take if you suspect hazardous materials are a danger.

### What Are Hazardous Materials?

As discussed in the previous lesson, materials are considered hazardous if they:

- Corrode other materials.
- Explode or are easily ignited.
- React strongly with water.
- Are unstable when exposed to heat or shock.
- Are toxic to humans, animals, or the environment.

### Household Chemical Emergencies

Nearly every household uses products that contain hazardous materials. You need to read the labels on products to learn how to use them properly. Most chemical accidents are preventable. However, because accidents do happen, knowing what to do if there is a hazardous materials emergency is important. Taking the appropriate actions can reduce the risk of injury.

Some household chemicals are dangerous when inhaled. Others are dangerous when ingested or absorbed through the skin.

Exposed persons can display one or more of the following symptoms:

- Difficulty breathing
- Changes in skin color
- Headaches, blurred vision, dizziness
- Cramps or diarrhea
- Irritation of the eyes, skin, throat, or respiratory tract
- Clumsiness or lack of coordination

The labels on products provide important information about their proper use and their dangers.

### Preventing Household Chemical Emergencies

Besides using household chemicals properly, there are other ways to protect yourself in your home, such as the L.I.E.S. procedure:

- Limit the amount of hazardous materials that you have stored.
- Isolate products in approved containers, and protect them from sources of ignition.
- Eliminate products that are no longer necessary by disposing of them properly.
- Separate incompatible materials.

### Household Chemicals: Safe Handling

Follow these tips to ensure safe handling of household chemicals.

- Read all directions before buying and using a new chemical product. Be sure to store household chemicals according to the instructions on the label in a safe, secure location, out of the reach of children.
- Avoid mixing products. Deadly fumes can result from the mixture of chemicals, such as chlorine bleach and ammonia.
- Never smoke while using household chemicals. Avoid using hair spray, cleaning solutions, paint products, or pesticides near an open flame, pilot light, lit candle, fireplace, wood-burning stove, etc. Although you may not be able to see or smell them, vapors could ignite causing a fire or explosion.
- If you spill a chemical, follow directions for cleaning it up or contact outside help. Protect your eyes and skin. Use rubber gloves and goggles, and dispose of cleaning materials as directed on the product label.

### What To Do if a Household Chemical Emergency Occurs

How you respond in a household chemical emergency may help prevent a serious injury. What you should do depends on the type of exposure and the chemical.

- **If a poison is consumed**, find the container(s) and call the poison control center (800-222-1222) immediately. Follow the directions that you are given.
- **If a chemical gets into the eyes**, flush with water for at least 15 minutes. If possible, have someone else call 9-1-1.
- **If there is a danger of fire or explosion**, get out of the building immediately. When you are safely outside and away from the danger, call the fire department. Stay upwind and uphill from the building.

### Knowledge Review



**Instructions: Review each statement and then indicate if it is true or false. When you are finished, turn to the next page to check your answers.**

1. Many items that we use in the home regularly can be hazardous if handled, stored, or disposed of improperly.  
 True  False
2. If you suspect that a child has ingested a chemical, you should call the poison control center immediately.  
 True  False
3. If there is a danger that a household chemical may catch fire or explode, you should clean it up quickly.  
 True  False

### Knowledge Review: Answer Key



**Instructions: Compare your answers to those shown below.**

1. **TRUE:** Many items that we use in the home regularly are hazardous when handled, stored, and disposed of improperly.

**Products that are safe may pose a real risk to health, safety, and the environment if they are not handled, stored, or disposed of according to the product directions.**

2. **TRUE:** If you suspect that a child has ingested a chemical, you should call the poison control center immediately.

**Delay in calling the poison control center could result in a more serious injury or even death. The poison control center can provide direction based on the chemical and the weight of the child.**

3. **FALSE:** If there is a danger that a household chemical may catch fire or explode, you should try cleaning it up quickly.

**If there is a danger that a household chemical could catch fire or explode, evacuate immediately to an upwind location to avoid breathing the fumes. Call the fire department from a location that is a safe distance from the chemical.**

### Identifying Stored Hazardous Materials

Hazardous materials can be stored in production facilities, storage tanks, warehouses, schools, places of worship, and other places throughout every community. To identify these locations and provide information about the hazardous materials, the National Fire Protection Association (NFPA) developed the **NFPA 704 Diamond**.

The NFPA 704 Diamond is a standard system for identifying the hazards associated with specific materials stored at fixed facilities.

### NFPA Diamond: Four Quadrants

The NFPA 704 Diamond is divided into four colored quadrants. Each quadrant provides information about the materials inside. Blue represents health hazard, red represents flammability, yellow represents reactivity, and white provides information about special precautions.

Within the blue, red, and yellow quadrants is a number from 1 to 4. The number indicates the degree of risk associated with the material. **The higher the number, the higher the risk!**

### NFPA Diamond: White Quadrant

The white quadrant has a symbol.

For example:

- ~~W~~ indicates a material, such as magnesium, that shows unusual reactivity with water.
- OX indicates a material, such as ammonium nitrate, that reacts with oxygen.

### What To Do if You Encounter an NFPA Placard

An NFPA 704 Diamond indicates hazardous materials inside a location. Because of the danger of leaking and spillage after a disaster, **CERT members should consider these placards a "stop sign."**

The only actions that CERT members should take when a facility is placarded with an NFPA 704 Diamond are to warn people of the danger and to evacuate them to an upwind and uphill location.

### Knowledge Review



**Instructions: Select the correct answer. When you are finished, turn to the next page to check your answers.**

1. The NFPA 704 Diamond is used to identify hazardous materials being:
  - Transported by vehicle.
  - Transported by rail.
  - Stored at a fixed location.
  - Produced.
  
2. A number from 1 to 4 inside the blue, red, and yellow quadrants of the NFPA 704 Diamond indicates:
  - Degree of risk.
  - Chemical class.
  - Reactivity.
  - Flammability.
  
3. When encountering any type of hazardous materials, CERT members should:
  - Try to determine the degree of risk from the materials.
  - Take the steps necessary to ensure that the materials do not catch fire.
  - Evacuate to an upwind, uphill location.
  - Leave the materials alone but continue other operations.

### Knowledge Review: Answer Key



**Instructions: Compare your answers to those shown below.**

1. The NFPA 704 Diamond is used to identify hazardous materials being:

- Transported by vehicle
- Transported by rail
- Stored at a fixed location**
- Produced

The NFPA 704 Diamond may be used on transport vehicles, but its main purpose is to indicate hazardous materials in storage **at a fixed location.**

2. A number from 1 to 4 inside the blue, red, and yellow quadrants of the NFPA 704 Diamond indicates:

- Degree of risk**
- Chemical class
- Reactivity
- Flammability

The numbers in the blue, red, and yellow quadrants of the NFPA 704 Diamond indicate the degree of risk. **The higher the number, the higher the risk!**

3. When encountering any type of hazardous materials, CERT members should:

- Try to determine the degree of risk from the materials.
- Take the steps necessary to ensure that the materials do not catch fire.
- Evacuate to an upwind, uphill location.**
- Leave the materials alone but continue other operations.

CERT members should treat any hazardous material as a "stop sign." **Evacuate immediately to an upwind, uphill location.**

### Identifying Hazardous Materials in Transit

The Department of Transportation (DOT) has developed a placard system to identify hazardous materials in transit. DOT placards:

- Use a combination of colors, symbols, and numbers.
- Indicate hazardous cargo carried in the vehicle or rail car.

Always use caution around any vehicle in an accident because:

- Placards are not required for less than 1,001 pounds of many hazardous materials.
- Sometimes drivers forget to change the placard when they change their cargo.

The DOT placard system is the most commonly used in the United States. There are two other placarding systems that you may also see. These are:

- The United Nations (UN) system, which is used internationally but is also used within the United States.
- The North American (NA) system, which is being phased out but is still used on some shipments from Canada.

### Knowledge Review



**Instructions: Review each statement and then indicate if it is true or false. When you are finished, turn to the next page to check your answers.**

1. The DOT placard system was developed to identify hazardous materials in transit.

True  False

2. A vehicle containing hazardous materials will always display a placard.

True  False

3. The DOT system is the only placarding system used in the United States.

True  False

### Knowledge Review: Answer Key



**Instructions: Compare your answers to those shown below.**

1. **TRUE:** The DOT placard system was developed to identify hazardous materials in transit.

**A DOT placard indicates hazardous cargo in a vehicle or rail car.**

2. **FALSE:** A vehicle containing hazardous materials will always display a placard.

**Because small loads of many hazardous materials do not require placards, you should always be careful near a vehicle in an accident.**

3. **FALSE:** The DOT system is the only placarding system used in the United States.

**Others currently in use are the United Nations (UN) system and the North American (NA) system.**

### Lesson Summary

In this lesson, you learned:

- Chemicals can become hazardous when mishandled, mixed, or spilled.
- To protect yourself in your home or workplace, use the L.I.E.S. procedure.
- CERTs should never enter a building placarded with an NFPA 704 Diamond.
- If hazardous materials are present, the only actions that CERTs should take are to warn others of the danger and evacuate them to an upwind, uphill location.

### Next Lesson

You have completed this lesson. You are now ready to begin Lesson 10: Terrorism and CERT.