Identifying Hazardous Materials
Unit 3

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Unit 3 Objectives

The responder shall be able to;

- Identify basic information found within marking systems.
- When given colors and symbols used to convey hazards on US DOT placards and labels, shall match the information to the proper US DOT hazard class and division.
- When given a product label, shall identify product name, precautionary statements, and manufacturer contact information.
- Shall identify the markings used in the industrial environment and shall identify the information found on industrial markers.

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General Safety Considerations For Responders While Identifying Hazardous Materials

A chemical may have multiple hazards.

- A chemical reaction that produces another hazardous material or a violent energy release.
- Some hazardous materials when exposed to an energy stressor may react violently or release energy.
- A pressurized container may rupture violently when exposed to a thermal stressor.
- Any liquid if heated in a closed container may BLEVE (Boiling Liquid Expanding Vapor Explosion).

3

Critical Information for HazMat Responders

- **Recognize** that hazardous materials are present
- **Identify** the hazardous material

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Using Human Senses to Recognize Hazardous Materials

- **Responders should not taste, touch, or smell hazardous materials!**
- Listen for any unusual sounds that may indicate trouble.
  - Materials escaping under pressure produce a whistle or hissing sound.
  - Metal containers will "ping" and "pop" as they are stressed.
- The sense of sight helps the emergency responder see things in the initial size-up:
  - Unusual clouds or vapors,
  - Victims exhibiting signs and symptoms of illness or injury from exposure,
  - Observations of unusual conditions dead animals or vegetation, discoloration of objects.

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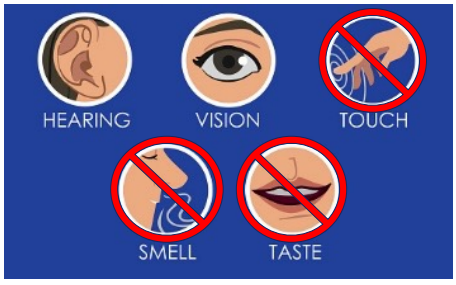

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Identification Markings

CONTAINER MARKINGS
- Product Labels
- Pesticide Labels
- US DOT Placards and Labels

FACILITY MARKINGS
- OSHA Hazard Communications System
- NFPA 704M Hazard Diamond
- Industrial Markings
- Military Markings

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DOT Hazard Classes Placards and Labels

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DOT Placards and Labels

Placards are square-on-point signs that are 10.8" by 10.8" (273mm x 273mm)

Placards are required to be placed on vehicle hauling certain amounts of hazardous materials.

Placards are required to be displayed on all four sides of the vehicle.

Vehicles are marked for the primary hazard of the material loaded onto it.

Labels are applied to the individual package containing hazardous materials.

Multiple labels are used to describe all of the hazards a material may present.

The primary hazards is the one hazard that poses the greatest risk.

Secondary risks also called subsidiary hazards are the secondary hazards of a material class of the assigned hazard.

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Identification Numbering Systems

- United Nations or North America numbering systems, are 4-digit numbers used to identify individual materials or chemical families of materials.
- Identification numbers can be found in shipping papers, and on the transport vehicle or product container.
- UN ID numbers will appear on either the placard displaying the hazard of the material or on an orange panel on the side of the transport container.

1203

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UN ID #

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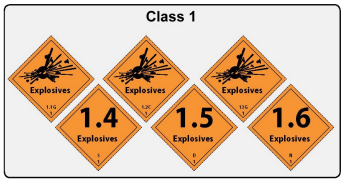
Class 1 - Explosives

Explosive – 6 Divisions

Explosives are any chemical compound, mixture, or device of which the primary function is to produce an explosion. An explosion is the substantial, instantaneous release of gases and heat.



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Class 2 - Gases

Gases are classified as any material that has a boiling point of less than 68°F at 14.7 psi

Class 2 materials can be shipped as compressed gases, liquefied compressed gases, compressed gases dissolved in solutions, cryogenic liquids.

- 2.1 Flammable
- 2.2 Non-Flammable Compressed Gas
- 2.3 Toxic Inhalation Hazard

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Class 3 – Flammable Liquids

Flammable liquids are materials that have a boiling point greater than 68°F and a flash point of not more than 141°F.

Combustible liquids are liquids that do not meet the definition of any other hazard class and have a flash point between 141°F and 200°F.

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Class 4 – Flammable Solids

Flammable solids are any materials, except explosives classified as class 1 materials, that can be readily ignited and will burn intensely and persistently and cause a transportation hazard.

- Flammable Solid
- Spontaneously combustible
- Dangerous When Wet

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Class 5 - Oxidizers

Oxidizers are materials that can, generally by yielding oxygen, cause or enhance the combustion of other materials.

Organic peroxides are materials that contain two oxygen atoms are bonded or joined together. This produces an unstable chemical bond.

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Class 6 - Poisons

Poisonous materials are solids and liquids that cause negative changes to the health of an organism. Many materials that can be utilized as weapons of mass destruction fit into this hazard class.

Infectious substances are materials composed or contaminated with microorganisms and/or their toxins.

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Class 7 – Radioactive Material

Radioactive materials are any materials that have a specific activity greater than 0.002 microcuries per gram .Specific activity is the measure of the amount of radioactivity per unit of measure. Radioactive materials emit radiation.

A radioactive material, due to nuclear instability, will be emitting particles and energy.

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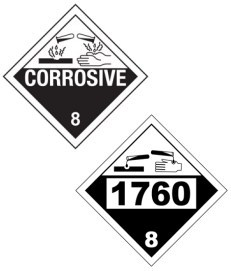
Class 8 - Corrosive

Corrosive materials are solids or liquids that cause full thickness destruction of human skin at the point of contact within a specific period of time or a liquid that has a severe corrosion rate on steel or aluminum.



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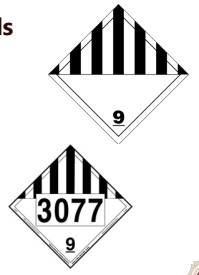
Class 9 – Miscellaneous Hazards

Materials that present a hazard during transportation but do not meet the definition of any other hazard class.

This class includes:

Materials which have anesthetic or noxious characteristics which could cause extreme annoyance or discomfort, **or** elevated temperature materials, hazardous substances, hazardous waste, or marine pollutants.



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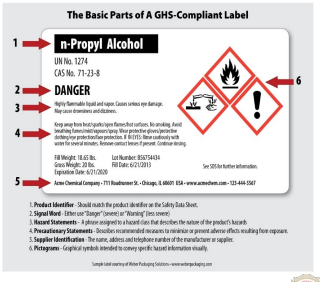
Product Labels



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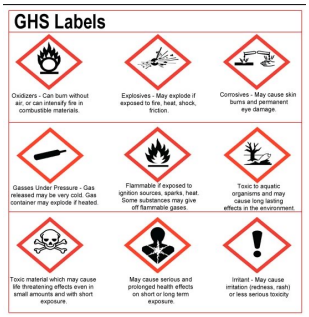
Global Harmonization System (GHS) Pictograms



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GHS Video

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Pipeline Markings

- Pipelines markers identify the product and who owns the pipeline, and a contact number is provided for emergency. The contact number is monitored by a control room that can start the pipeline shut-down procedure.

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NFPA - 704

The NFPA-704 marking system is designed primarily for fixed-facility use. However, emergency responders may see this marking system used elsewhere, such as in reference material or on individual packages.

The NFPA 704 standard recognizes two specific special hazards:

- Water reactivity (~~W~~)
- Oxidizing capability (**OX**)

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	HEALTH	FIRE	INSTABILITY
4	Materials that under emergency conditions can be lethal.	Flammable gases, flammable cryogenic materials, very volatile flammable liquids, or materials that are pyrophoric.	Materials that are capable of detonation or explosive decomposition at ambient conditions.
3	Materials that under emergency conditions can cause serious or permanent injury.	Materials that can be ignited under almost all normal temperature conditions.	Materials that are capable of detonation, explosive decomposition, or explosive reaction, but require a strong initiating source.
2	Materials that under emergency conditions can cause temporary incapacitation or residual injury.	Materials that must be moderately heated or exposed to relatively high ambient temperature before ignition occurs.	Materials that undergo a violent chemical change at elevated temperatures and pressures.
1	Materials that under emergency conditions can cause significant irritation.	Materials that must be preheated before ignition can occur.	Materials that can become unstable at elevated temperatures and pressures.
0	Materials that, under emergency conditions, would offer no health hazard beyond that of ordinary combustible materials.	Materials that do not burn.	Materials are normally stable.

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OSHA Hazard Communication System (HAZCOM)

OSHA requires that employees have a right to know what they are being exposed to and the potential effects of exposure.

The OSHA-required information, usually called HAZCOM or HMIS (Hazardous Materials Identification System), displays information in a similar fashion as NFPA 704 in that they use colors and numbering systems to express the hazard of the material in normal occupational activities.

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	HEALTH	FIRE	Physical Hazards
4	Life-threatening, major or permanent injury may result from a single or multiple overexposure.	Flammable gases or very volatile flammable liquids with flash points below 73°F. May ignite spontaneously with air.	Materials capable of explosive water reaction, detonation, or explosive decomposition, polymerization, or self-reaction at normal conditions.
3	Major injury likely unless prompt action is taken, and medical treatment is given.	Materials that can be ignited under almost all normal temperature conditions.	Materials that are capable of detonation, explosive decomposition, or explosive reaction, but require a strong initiating source.
2	Temporary or minor injury may occur.	Materials that must be moderately heated or exposed to relatively high ambient temperature before ignition occurs.	Materials that undergo a violent chemical change at elevated temperatures and pressures.
1	Irritation or minor reversible injury possible.	Materials that must be preheated before ignition can occur.	Materials that can become unstable at elevated temperatures and pressures.
0	No significant risk to health.	Materials that do not burn.	Materials are normally stable.

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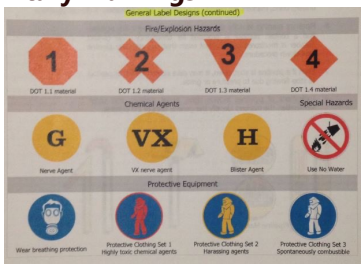
Military Markings



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