Labels
### HAZARDOUS MATERIALS LABELING CHART

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
<th>Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Explosives</td>
<td>Ammonium nitrate, nitroglycerin, TNT, dynamite, etc.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Flammable liquids</td>
<td>Methanol, gasoline, ethanol, acetone, etc.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Flammable solids</td>
<td>Glycerin, ethyl alcohol, acetylene, etc.</td>
</tr>
<tr>
<td>Class 4</td>
<td>explosives</td>
<td>Ammonium nitrate, nitroglycerin, TNT, dynamite, etc.</td>
</tr>
<tr>
<td>Class 5</td>
<td>Oxygenate</td>
<td>Paints, lacquers, varnishes, etc.</td>
</tr>
<tr>
<td>Class 6</td>
<td>Poisonous</td>
<td>Mercury, lead, arsenic, cyanide, etc.</td>
</tr>
<tr>
<td>Class 7</td>
<td>Infectious materials</td>
<td>Bacteria, viruses, etc.</td>
</tr>
<tr>
<td>Class 8</td>
<td>Radioactive</td>
<td>Uranium, thorium, radium, etc.</td>
</tr>
</tbody>
</table>

### General Guidelines on Use of Labels

1. The shipper must attach the appropriate label(s) to each package of hazardous material offered for shipment unless exempted from the requirements (§173.405). |
2. If the material in a package has more than one hazard, the package must be labeled for each hazard (§173.407). |
3. If two or more hazardous materials of different classes are packed within the same packaging in volume ratios, the labeling of the package or enclosure must be labeled for each class of hazardous material involved. For exceptions see §173.404 (2.1)(4). |
4. Radiological material requiring labeling must be labeled on or two opposite sides of the package (§173.408). |
5. A label should only be applied to a package containing a hazardous material if the hazardous material is represented on the label. |
6. No one may offer or transport a package bearing any marking or label which is in color, design, or shape could be construed to conflict with a hazardous materials label. This does not prohibit the use of labels in conformance with U.N. Recommendations (3.4). |

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### Packaging Labels

**ACETONE**

**DANGER**

HIGHLY FLAMMABLE LIQUID AND VAPOR. CAUSES SEVERE EYE IRRITATION. MAY CAUSE DROWSINESS OR DIZZINESS.

**PRECAUTIONS**

- Keep away from heat, sparks, and other sources of ignition. Handle carefully. Do not expose to temperature changes. Do not use near open flames. Do not smoke. Do not use in areas where a combustible gas is present. Do not use near live electrical equipment. Do not use near flammable materials. Do not use near open flames.

**RESPONSE**

- If inhaled, move to fresh air. If not breathing, give artificial respiration. If conscious, let person breathe fresh air. If skin or clothing is affected, remove clothing and wash with water. If swallowed, do not induce vomiting. Give plenty of water. Do not use an emetic except under medical supervision.

**STORAGE**

- Store in a secure, cool, and well-ventilated place. Keep container tightly closed.

**DISPOSAL**

- Dispose of contents/container to a licensed chemical disposal agency in accordance with local, state, and federal regulations.

For more information reference 320.
Hazard Classes

1. Explosives
2. Compressed Gas
3. Flammable Liquids
4. Flammable Solids
5. Oxidizers
6. Toxins
7. Radioactive
8. Corrosives
Class 1 - Explosives

1.1 Mass explosion hazard
   (dynamite, TNT)

1.2 Projection hazard
   (aerial flares, detonating cord)

1.3 Predominately a fire hazard
   (liquid fueled rocket motors, propellant explosives)

1.4 No significant blast hazard
   (practice ammunition, signal cartridges)

1.5 Very insensitive explosives; blasting agents
   (pilled ammonium nitrate fertilizer-fuel oil mixtures)

1.6 Extremely insensitive detonating substances
   (items with a negligible probability of accidental initiation or propagation)
Class 2 - Gases

2.1 Flammable gases
(methyl chloride, propane)

2.2 Non-flammable compressed gases
(anhydrous ammonia, carbon dioxide, compressed nitrogen)

2.3 Poisonous gases
(chlorine, arsine, methyl bromide)
Class 3 – Flammable and Combustible Liquids

Flammable - Flashpoint at or below 60°C (140°F)  
(acetone, gasoline)

Combustible – Flashpoint above 60°C (140°F) and below 93 °C (200 °F)  
(No. 6 fuel oil, mineral oil)
4.1 Flammable Solids
   (magnesium pellets, nitrocellulose)

4.2 Spontaneously Combustible
   (charcoal briquettes, phosphorous)

4.3 Dangerous When Wet
   (magnesium powder, sodium hydride)
5.1 Oxidizers
   (ammonium nitrate, calcium hypochlorite)

5.2 Organic Peroxides
   (dibenzoyl peroxide, per oxyacetic acid)
Class 6 – Toxic & Infectious Substances

6.1 Toxic or Poison
(arсенic compounds, carbon tetrachloride, tear gas)

6.2 Infectious Substance (Etiologic Agent)
(anthrax, botulism, rabies, tetanus)
Examples
- cobalt
- uranium hexafluoride
- “yellow cake”
Class 8 – Corrosive Materials

Examples
Acids
(nitric acid, sulfuric acid, batteries)
Alkalis
(sodium hydroxide)
Class 9 – Miscellaneous Hazardous Materials

A material which presents a hazard during transportation but which does not meet the definition of any other hazard class, including:

- Elevated Temperature Material
- Hazardous Substance
- Hazardous Waste
- Marine Pollutant

**Examples**
- Lithium batteries
- Hot liquid asphalt
- PCBs
- Molten sulfur
- Dry Ice
Hazard Communication Labels

Types of labels:
• HCS shipping labels
• HCS workplace labels
• NFPA 704 labels
• HMIS labels
• DOT shipping labels, placarding, and markings

Source of graphics: OSHA
Precaution !!!

- **Original Container**: Must retain their original labels in a legible condition

- **Secondary Container**: Into which you transfer working quantities of chemical products; must be clearly labeled to identify the contents (including water).
Hazard Communication Labels

Required elements for HCS shipping labels:

- Product identifier
- Signal word
- Hazard statement(s)
- Precautionary statement(s)
- Pictogram
- Name, address, telephone number

Source: OSHA
Hazard Communication Labels

Indicates the relative level of severity of hazard;

“Danger” is used for more severe hazards and “Warning” for less severe hazards

Figure 5: Example of Required HCS Label Elements

Product Identifier

Pictogram (Symbol in Red Frame)

Signal Word (Danger)

Signal Word (Warning)

Precautionary Statement(s) (Keep away from heat and open flame. Do not use or store near heat. Do not attempt to extinguish, unless leak can be stopped safely. Use suitable extinguishing agent if necessary.)

Name, Address, and Telephone Number of Manufacturer, Importer, or Other Responsible Party

Pictograms convey specific information about the hazards of a chemical in symbols and other graphic elements

Source: OSHA
Hazard Communication Labels

Image of an Exclamation Mark

Figure 3: HazCom 2012 Pictograms

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Flame</th>
<th>Exclamation Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinogen</td>
<td>Flammables</td>
<td>Irritant (skin and eye)</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Pyrophorics</td>
<td>Skin Sensitizer</td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>Self-Heating</td>
<td>Acute Toxicity (harmful)</td>
</tr>
<tr>
<td>Respiratory Sensitizer</td>
<td>Emits Flammable Gas</td>
<td>Narcotic Effects</td>
</tr>
<tr>
<td>Target Organ Toxicity</td>
<td>Self-Reactives</td>
<td>Respiratory Tract</td>
</tr>
<tr>
<td>Aspiration Toxicity</td>
<td>Organic Peroxides</td>
<td>Irritant</td>
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<tr>
<th>Gas Cylinder</th>
<th>Corrosion</th>
<th>Expanding Bomb</th>
</tr>
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<tbody>
<tr>
<td>Gases Under Pressure</td>
<td>Skin Corrosion/Burns</td>
<td>Explosives</td>
</tr>
<tr>
<td></td>
<td>Eye Damage</td>
<td>Self-Reactives</td>
</tr>
<tr>
<td></td>
<td>Corrosive to Metals</td>
<td>Organic Peroxides</td>
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<table>
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<tr>
<th>Flame Over Circle</th>
<th>Environment (Non-Mandatory)</th>
<th>Skull and Crossbones</th>
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<tr>
<td>Oxidizers</td>
<td>Aquatic Toxicity</td>
<td>Acute Toxicity (fatal or toxic)</td>
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Source: OSHA
# Hazard Communication Labels

**Exploding Bomb**

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<td>- Target Organ Toxicity</td>
<td>- Self-Reactives</td>
<td>- Respiratory Tract Irritant</td>
</tr>
<tr>
<td>- Aspiration Toxicity</td>
<td>- Organic Peroxides</td>
<td>- Hazardous to Ozone Layer (Non-Mandatory)</td>
</tr>
</tbody>
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<th>Exploding Bomb</th>
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<td>- Skin Corrosion/ Burns</td>
<td>- Explosives</td>
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<td>- Eye Damage</td>
<td>- Self-Reactives</td>
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Source: OSHA
# Hazard Communication Labels

## Skull and Crossbones

![Image of Skull and Crossbones Pictogram]

### Health Hazard
- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

### Flame
- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

### Exclamation Mark
- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

### Gas Cylinder
- Gases Under Pressure

### Corrosion
- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

### Exploding Bomb
- Explosives
- Self-Reactives
- Organic Peroxides

### Flame Over Circle
- Oxidizers

### Environment (Non-Mandatory)
- Aquatic Toxicity

### Skull and Crossbones
- Acute Toxicity (fatal or toxic)

---

Source: OSHA
Hazard Communication Labels

Statement assigned to hazard class and category that describes the nature of the hazard(s), of a chemical, including, where appropriate, the degree of hazard.

Describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

Source: OSHA
Hazard Communication Program

Requirements for workplace labels:

• Same information as label from manufacturer or product identifier and words, pictures, symbols or combination thereof

• May include signs, placards, process sheets, batch tickets, operation procedures, other written materials

Source of graphics: OSHA
Hazard Communication Labels

- Alternative workplace labels:
  - Permitted for workplace labels
  - Must provide at least general information regarding hazards of chemicals
  - Hazard warnings or pictograms that conflict with HCS label elements cannot be used
  - Examples: NFPA 704 and HMIS
Hazard Communication Labels

Other labels:

• NFPA 704
  – Overall diamond shape made up of four smaller diamonds
  – Each smaller diamond is a different color
  – Numbers within smaller diamonds represent severity of hazard

Source: OTIEC
Hazard Communication Labels
– NFPA 704 – hazards and severity ratings

- **Blue = Health Hazards**
  - 0 = normal material that poses no health hazard
  - 1 = slight hazard
  - 2 = moderate hazard
  - 3 = extreme hazard
  - 4 = deadly hazard

- **Red = Flammability Hazards**
  - 0 = will not burn
  - 1 = flashpoint above 200°F
  - 2 = flashpoint between 100 – 200°F
  - 3 = flashpoint below 100°F
  - 4 = flashpoint less than 73°F

- **Yellow = Instability Hazards**
  - 0 = normally stable
  - 1 = slight hazard
  - 2 = moderate hazard
  - 3 = extreme hazard
  - 4 = deadly hazard

- **White = Other Special Hazards**
  - W = reactivity to water
  - OX = oxidizer
  - SA = simple asphyxiant
  - 1 = slight hazard
  - 2 = moderate hazard
  - 3 = extreme hazard
  - 4 = deadly hazard

Source: OTIEC
Hazard Communication Labels

Source: OSHA
Hazard Communication Labels

- HMIS label
  - Intended for “In-plant” (workplace) labeling compliance
  - Color-coded bars
  - Numerical scale, 0-4, with 0 as lowest hazard and 4 as highest hazard
    - 0 = minimal hazard
    - 1 = slight hazard
    - 2 = moderate hazard
    - 3 = serious hazard
    - 4 = severe hazard

(Product identity)

- HEALTH
- FLAMMABILITY
- PHYSICAL HAZARD
- PERSONAL PROTECTION
### Hazard Communication Labels

- **HMIS hazard indicators**

<table>
<thead>
<tr>
<th>(Product identity)</th>
<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
<th>PERSONAL PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health ratings:</strong></td>
<td>0 = no significant risk</td>
<td>1 = irritation/minor injury</td>
<td>2 = temporary/minor injury</td>
<td>3 = major injury</td>
</tr>
<tr>
<td><strong>Flammability ratings:</strong></td>
<td>0 = will not burn</td>
<td>1 = flashpoint &gt;200°F</td>
<td>2 = flashpoint ≥100°F, but &lt;200°F</td>
<td>3 = flashpoint &lt;73°F and boiling point &gt;100°F, or flashpoint between 73°F and 100°F</td>
</tr>
<tr>
<td><strong>Physical Hazard ratings:</strong></td>
<td>0 = normally stable</td>
<td>1 = normally stable, but can become unstable</td>
<td>2 = unstable</td>
<td>3 = explosive</td>
</tr>
</tbody>
</table>

#### PPE Index:
- A = safety glasses
- B = safety glasses + gloves
- C = safety glasses + gloves + apron
- D = face shield + gloves + apron
- E = safety glasses + gloves + dust respirator
- F = safety glasses + gloves + apron + dust respirator
- G = safety glasses + gloves + vapor respirator
- H = splash goggles + gloves + apron + vapor respirator
- I = safety glasses + gloves + dust and vapor respirator
- J = splash goggles + gloves + apron + dust and vapor respirator
- K = air-line hood or mask + gloves + full suit + boots
- X = ask supervisor or safety specialist

*Source: OTIEC*
<table>
<thead>
<tr>
<th>Category</th>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>*</td>
<td>2</td>
</tr>
<tr>
<td>Flammability</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Personal Protection</td>
<td>J</td>
<td></td>
</tr>
</tbody>
</table>

**Ammonium Hydroxide**

*Source: OTIEC*
Hazard Communication Labels

- DOT shipping containers – marking, labeling, and placarding
  - Uses graphic elements on square-on-point placards or labels to identify shipments of hazardous materials
  - Square-on-points have backgrounds of various colors
  - Where shipping container is also container used in workplace, workers must be made aware of DOT pictograms
  - DOT Classification – groups hazardous materials based on dangers posed in transportation; 9 classes
Hazard Communication Labels

- Labels
- Placards
- Markings
Hazard Communication Labels

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

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

CLASS 2 Gases: Divisions 2.1, 2.2, 2.3

CLASS 3 Flammable Liquid

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

CLASS 5 Oxidizer, Organic Peroxide: Divisions 5.1 and 5.2

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

CLASS 7 Radioactive

CLASS 8 Corrosive

CLASS 9 Miscellaneous Hazardous Material

Cargo Aircraft Only

For Regulated Medical Waste (RMW), an Infectious Substance label is not required on an outer packaging if the OSHA Biohazard marking is used as prescribed in 29 CFR 1910.1030(g). A bulk package of RMW must display a BIOHAZARD marking.
Hazard Communication Labels

DOT Markings

This Was Discontinued 12/31/2020
Locating Information

Example 1: HS85 Label

HS85
Batch number: 85L6543

Warning
Harmful if swallowed

Wash hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Dispose of contents/container in accordance with local, state and federal regulations.

First aid:
If swallowed: Call a doctor if you feel unwell. Rinse mouth.

GHS Example Company, 123 Global Circle, Anyville, NY 130XX

Telephone (888) 888-8888

Source: OSHA
## Locating Information

**Identifier:** NOMIXUP 7042012

**DANGER!**

### Hazard Statements:
- Extremely Flammable Gas
- May Cause Cancer
- May Cause Respiratory Irritation
- In Contact with Water Releases Flammable Gas

### Precautionary Statements:
- Keep away from heat/sparks/open flames/hot surfaces.
- No Smoking
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Avoid breathing vapors and mists.
- Wear protective gloves and eye protection.
- If inhaled: Remove person to fresh air and keep comfortable for breathing.
- Call poison center/doctor if you feel unwell.
- Leaking Gas Fire: Do not extinguish unless leak can be stopped safely.
- Eliminate all ignition sources if safe to do so.
- Store in tightly closed container in a well-ventilated place, locked up.
- Use outdoors or use in a well-ventilated place.
- Dispose of contents in accordance with local/regional/national regulations.

**XYZ Chemical Company** 123 Main St. Anywhere, NY, USA  1-800-000-1111

*Source: OSHA*
What is the product difference ???

![Diagram showing two hazard symbols: one labeled 2 and the other labeled POISON 6.](Image)