

## What is GHS?

- 0 **Globally Harmonized System of Classification and Labeling of Chemicals**
- 0 A standardized approach to classifying and labeling chemicals based on hazards
- 0 A United Nations program meant to encourage environmentally sound management of chemicals
- 0 Adopted by US OSHA in 2012

## Why GHS?

- To unify chemical labeling standards across agencies, regions, and countries
  - Before GHS, each region had unique labeling regulations, making international shipment complex
  - Many labels and safety data sheets were required for a single chemical
- Under one system, it is easier for end users to understand hazard labels

## OSHA Components

- In 2012, the U.S. Occupational Safety and Health Administration (OSHA) adopted relevant parts of the GHS, including:
  - Chemical labeling standards
  - Safety data sheet guidelines

# Chemical Labeling

0 Composed of 5 sections:

- 0 Product identifier
- 0 Hazard pictograms
- 0 Signal word
- 0 Precautionary measures
- 0 Supplier information

**ACETYLENE, DISSOLVED  
UN 1001**

**DANGER!** Contains gas under pressure; may explode if heated. Extremely flammable gas. Explosive with or without contact with air.

**PRECAUTIONS:** Keep away from heat / sparks / open flames / hot surfaces. - No smoking. Eliminate all ignition sources if safe to do so. Protect containers from physical damage. Store in a well-ventilated place. Wear eye protection, safety gloves / shoes while handling gas cylinders.

**FIRST AID:** If inhaled, remove victim to fresh air. If breathing is difficult, administer oxygen. If breathing stopped, begin artificial respiration. Call physician. Keep victim warm and rested.

**SEE SAFETY DATA SHEET**

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# Product Identifier

- 0 The chemical identity of the substance
  - 0 May include the UN number
  - 0 Chemical mixtures list names of all ingredients that contribute to its hazardous properties

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# Hazard Pictograms

- A black symbol on a white background with a red diamond frame
- 9 different symbols
  - Denote hazard classes



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# Hazard Classes



 <ul style="list-style-type: none"> <li>• Acute toxicity (severe)</li> </ul>	 <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Respiratory sensitizer</li> <li>• Reproductive toxicity</li> <li>• Target organ toxicity</li> <li>• Mutagenicity</li> <li>• Aspiration toxicity</li> </ul>	 <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Self reactive</li> <li>• Pyrophoric</li> <li>• Self-heating</li> <li>• Emits flammable gas</li> <li>• Organic peroxide</li> </ul>
<ul style="list-style-type: none"> <li>• Corrosive</li> </ul>	<ul style="list-style-type: none"> <li>• Oxidizer</li> </ul>	<ul style="list-style-type: none"> <li>• Explosive</li> <li>• Self reactive</li> <li>• Organic peroxide</li> </ul>
 <ul style="list-style-type: none"> <li>• Gas under pressure</li> </ul>	 <ul style="list-style-type: none"> <li>• Environmental toxicity</li> </ul>	 <ul style="list-style-type: none"> <li>• Irritant</li> <li>• Dermal sensitizer</li> <li>• Acute toxicity (harmful)</li> <li>• Narcotic effects</li> <li>• Respiratory tract</li> <li>• Irritation</li> </ul>

<http://www.osha.gov/dsg/hazcom/ghs.html> Figure 4.9

## Signal Word

- Indicates how severe the **most severe** hazard is
- “**Danger**”
  - more severe hazard
  - A “fatal” or “toxic” outcome
- “**Warning**”
  - Less severe hazard
  - A “harmful” outcome

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## Precautionary Measures

- How to prevent the adverse outcomes of the hazards
  - May include first aid, spill response, exposure response, storage, or disposal recommendations



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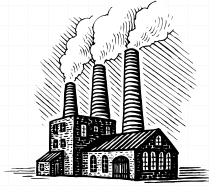
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# Supplier Identification

- 0 The name, address, and telephone number of the manufacturer/supplier



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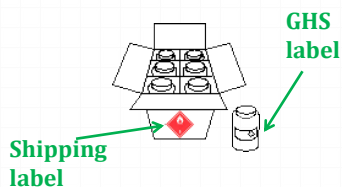


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## Where to find GHS labels

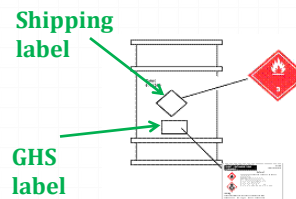
### Combination Packaging (outer box with inner bottles)

- On each inner bottle
- Not to be confused with the shipping label, which is on the outer shipping box



### Single Packaging (e.g. 55 gal. drum)

- May be combined with the shipping labels or attached as separate items on the same package



<http://www.osha.gov/dsg/hazcom/ghs.html> Figure 4.13, 4.14

## Safety Data Sheets (SDS)

- Formerly Material Safety Data Sheets (MSDS)
- Standardized forms used by persons working with chemicals to learn about their hazards and safety precautions
  - May include transporters, laboratory workers, emergency responders, poison centers, etc.
- Composed of 16 sections



## SDS Sections

Section No.	Heading	Components
1	Identification of substance and supplier	GHS product identifier Other means of identification Recommended use of the chemical and restrictions on use Suppliers details (name, address, phone number) Emergency phone number
2	Hazards identification	GHS classification of the substance and any national or regional information GHS elements, including precautionary statements Other hazards which do not result in classification or aren't covered by GHS
3	Composition/information on ingredients	Chemical identity Common name, synonyms, etc. CAS number, EC number, etc. Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance
4	First aid measures	Description of necessary measures, subdivided according to different routes of exposure Most important symptoms/effects Indication of immediate medical attention and special treatment needed
5	Firefighting measures	Suitable extinguishing media Specific hazards arising from the chemical Special protective equipment and precautions for firefighters
6	Accidental release measures	Personal precautions, protective equipment, and emergency procedures Environmental precautions Methods and materials for containment and cleaning up
7	Handling and storage	Precautions for safe handling Conditions for safe storage, including any incompatibilities

Section No.	Heading	Components
8	Exposure controls/personal protection	Control parameters, e.g., occupational exposure limit values or biological limit values Appropriate engineering controls Individual protection measures, such as personal protective equipment
9	Physical and chemical properties	Appearance, odor, odor threshold, pH, melting point/freezing point, boiling point and range, flash point, evaporation rate, flammability, vapor pressure, vapor density, relative density, solubilities, partition coefficient, autoignition temperature, decomposition temperature
10	Stability and reactivity	Chemical stability Possibility of hazardous reactions Conditions to avoid Incompatible materials Hazardous decomposition products
11	Toxicological information	The likely routes of exposure Symptoms Delayed and immediate effects Measure of toxicity
12	Ecological information	Ecotoxicity, degradability, soil mobility, bioaccumulative potential
13	Disposal considerations	Description of waste residues and information on their safe handling and disposal, including contaminated packaging
14	Transport information	UN Number, UN proper shipping name, transport hazard classes, packing group, special transport precautions
15	Regulatory information	Safety, health, and environmental regulations specific to the product in question
16	Other information including preparation and revision of the SDS	

<http://www.osha.gov/dsg/hazcom/ghs.html> Figure 4.8

## Where to find Safety Data Sheets

- With the shipping paperwork
  - The SDS should be attached to or inside of the shipment container
- AU's digital binders
  - MSDSonline (Facilities)
  - ChemSW (CAS)
- Online
  - Enter the chemical name and manufacturer along with "SDS" or "MSDS" into a search engine





## Implementation

- 0 OSHA has set forth a series of deadlines that both chemical manufacturers and importers must meet
- 0 **December 1, 2013:** Train employees on the new GHS label elements and Safety Data Sheet format
- 0 **June 1, 2015:** Compliance with all new GHS provisions to the new hazard communication rule, except:
- 0 **December 1, 2015:** Distributors must ship all hazardous materials with GHS-compliant labels
- 0 **June 1, 2016:** Update all workplace labels and hazard communication program; provide additional employee training on newly identified hazards

## References and Resources

- 0 This presentation is based on the guide, *The Globally Harmonized System of Classification and Labeling of Chemicals (GHS)*, which can be found on OSHA's website at:  
<http://www.osha.gov/dsg/hazcom/ghs.html>
- 0 For more information on OSHA's Hazard Communication standard, including the 2012 final rule, see:  
<http://www.osha.gov/dsg/hazcom/ghs.html>