

# GHS – 12/1/13

## Oh Sh!T



## OR

## No big deal



Bruce A. Donato, CSP, CHMM, CECD  
K & A First Aid & Safety, LLC

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1

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## HAZCOM 2012

**More than “read  
the new label and  
know that MSDS’s  
are now SDS’s”**

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## Agenda

- ▶ What were you supposed to know?
- ▶ Brief GHS History & Overview
- ▶ Timeline
- ▶ Are Other Standards Affected?
- ▶ My Pet Peeve
- ▶ What do you need to be doing?

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## What were you supposed to know?

- ▶ The following slides are from HAZCOM and HAZCOM 2012.
- ▶ This is not a test, but a self evaluation.
- ▶ Do you or did you know what you were supposed to know under the old HAZCOM?
- ▶ Do you understand the new HAZCOM?

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Is this dangerous for your employees?

DO NOT TAKE INTERNALLY

AVOID CONTACT WITH EYES, MOUTH OR CLOTHING **WARNING** AVOID BREATHING FUMES

**FLAMMABLE – KEEP FIRE AWAY**  
USE ONLY IN WELL VENTILATED AREAS.  
USE ONLY WHERE THERE ARE NO OPEN FLAMES OR OTHER SOURCES OF IGNITION.

EXTREMELY FLAMMABLE:  
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME.  
KEEP CONTAINER CLOSED.

ANTIDOTE:  
IMMEDIATELY FLUSH SKIN OR EYES WITH WATER FOR AT LEAST 15 MINUTES. REMOVE PATIENT FROM CONTAMINATED AREA. REMOVE ALL CONTAMINATED CLOTHING. KEEP PATIENT WARM. GET MEDICAL ATTENTION. NEVER ATTEMPT TO GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

**HAZARD IDENTIFICATION** **CODE NUMBERS**

 4-SEVERE  
3-SERIOUS  
2-MODERATE  
1-SLIGHT  
0-MINIMAL

**EXTINGUISHING METHOD** **PERSONAL PROTECTION**

USE "ALCOHOL" FOAM, DRY CHEMICAL OR CARBON DIOXIDE. WATER SPRAY MAY BE INEFFECTIVE BUT SHOULD BE USED TO KEEP CONTAINERS COOL.

WEAR EYE PROTECTION AND PERSONAL PROTECTION. CONSULT CORRESPONDING MSDS FOR FURTHER HAZARDOUS INFORMATION AND INSTRUCTIONS.

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Is this dangerous for your employees?

DO NOT TAKE INTERNALLY

AVOID CONTACT WITH EYES, MOUTH OR CLOTHING **WARNING** AVOID BREATHING FUMES

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**HAZARD IDENTIFICATION** **CODE NUMBERS**

This is very straight forward.

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Is this dangerous for your employees?

HAZARD IDENTIFICATION



EXTINGUISHING METHOD

PERSONAL PROTECTION

CODE NUMBERS

- 4-SEVERE
- 3-SERIOUS
- 2-MODERATE
- 1-SLIGHT
- 0-MINIMAL

**This is the NFPA diamond. Do you know what the colors mean?**

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Do you take special precautions for this?



**ACETYLENE GAS**

DO NOT TAKE INTERNALLY

AVOID CONTACT WITH EYES, MOUTH OR CLOTHING

**WARNING**

AVOID BREATHING FUMES

**FLAMMABLE - KEEP FIRE AWAY**

USE ONLY IN WELL VENTILATED AREAS.

USE ONLY WHERE THERE ARE NO OPEN FLAMES OR OTHER SOURCES OF IGNITION.

EXTREMELY FLAMMABLE

KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME.

KEEP CONTAINER CLOSED.

ANTIDOTE:

IMMEDIATELY FLUSH SKIN OR EYES WITH WATER FOR AT LEAST 15 MINUTES. REMOVE PATIENT FROM CONTAMINATED AREA. REMOVE ALL CONTAMINATED CLOTHING. KEEP PATIENT WARM. GET MEDICAL ATTENTION. NEVER ATTEMPT TO GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

HAZARD IDENTIFICATION



EXTINGUISHING METHOD

USE "ALCOHOL" FOAM, DRY CHEMICAL OR CARBON DIOXIDE. WATER SPRAY MAY BE INEFFECTIVE BUT SHOULD BE USED TO KEEP CONTAINERS COOL.

PERSONAL PROTECTION

WEAR EYE PROTECTION AND PERSONAL PROTECTION. CONSULT CORRESPONDING MSDS FOR FURTHER HAZARDOUS INFORMATION AND INSTRUCTIONS.

CODE NUMBERS

- 4-SEVERE
- 3-SERIOUS
- 2-MODERATE
- 1-SLIGHT
- 0-MINIMAL

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Is this dangerous for your employees?



Does a number 1  
concern you?

**Fire Procedures:** Use water as fog, dry chemical, carbon dioxide or alcohol-resistant foam.

**Spill Procedures:** Notify safety personnel, isolate and ventilate area. Shut off heat and ignition sources. Take up with inert material such as sand or vermiculite. Damp mop residue. Cleanup crew should protect against exposure.

CAS No. 107-21-1

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Is this dangerous for your employees?

**CAUTION IRRITANT**

**Emergency Overview:**

Colorless, thick, odorless liquid. Causes (when heated or misted): throat irritation, headache, eye effects, coma. Also causes: CNS, CVS, pulmonary/kidney/liver effects. Chronic: severe kidney problems. May cause birth defects based on animal data.

**Precautionary Measures:** Avoid exposure to skin. Wear protective clothing: Goggles, Gloves, Apron.

**First Aid Procedures:** Inhalation: Remove to fresh air and support breathing as needed.

Is an irritant bad?  
Do you know what CNS,  
CVS, or pulmonary mean?


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Is this dangerous for your employees?



## Ethylene Glycol

1,2-dihydroxyethane; 1,2-ethanediol; ethylene alcohol;  
glycol alcohol

CAUTION IRRITANT

**Emergency Overview:**  
Colorless, thick, odorless liquid. Causes (when heated or misted): throat irritation, headache, eye effects, coma. Also causes: CNS, CVS, pulmonary/kidney/liver effects. Chronic: severe kidney problems. May cause birth defects based on animal data.

**Precautionary Measures:** Avoid exposure to skin. Wear protective clothing: Goggles, Gloves, Apron.

**First Aid Procedures:** Inhalation: Remove to fresh air and support breathing as needed. Eyes/Skin: Flush with plenty of water for at least 15 minutes. Ingestion: Consult physician before inducing vomiting.

**Fire Procedures:** Use water as fog, dry chemical, carbon dioxide or alcohol-resistant foam.

**Spill Procedures:** Notify safety personnel, isolate and ventilate area. Shut off heat and ignition sources. Take up with inert material such as sand or vermiculite. Damp mop residue. Cleanup crew should protect against exposure.

CAS No. 107-21-1

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Is this dangerous for your employees?



## Warning

**Hazards:**  
Harmful if swallowed. Causes eye irritation.

**Precautions:**  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep container tightly closed in a cool and well ventilated place. Hygroscopic.

**Personal Protective Equipment:**




**Target Organs:**







Where did this information come from?

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# Information from the SDS

**SIGMA-ALDRICH**

**Material Safety Data Sheet**

Version 5.1  
Revision Date 03/04/2014  
Print Date 03/04/2014

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**1. PRODUCT AND COMPANY IDENTIFICATION**

Product Name	XXXXXXXXXX
Product Number	01008
Manufacturer	Sigma-Aldrich
Supplier	Sigma-Aldrich 3055 Lawrence Street St. Louis, MO 63103
Telephone	USA
Fax	+1 800 325 6000
Emergency Phone # (For 24h support and manufacturer)	+1 800 325 6000 (24h) 314 455-5000
Preparation Information	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-325-6000

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**2. HAZARD IDENTIFICATION**

**Emergency Overview**

OSHA Hazards  
Target Organ Effect, Harmful by ingestion., Teratogen


**Target Organs**

Liver, Cardiovascular system., Eyes, Kidney, Central nervous systemCentral nervous system, Kidney, Eyes,  
Cardiovascular system., Liver

OSHA Classification  
Acute toxicity (Oral Category 4)  
Corrosive (Category 2B)

OSHA Label elements, including precautionary statements

**Pictogram**



**Signal word**      **Warning**

**Hazard statements**

H302	Harmful if swallowed
H336	Irritates eyes (H360Df)

**Precautionary statements**

P301 + P312 + P331	IF SWALLOWED: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
--------------------	--

**HMIS Classification**


Health Hazard	2
Physical Hazard	1
Environmental Hazard	0

**NFPA Rating**

Health Hazard	2
Flam.	1

Signature: 03/04

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Page 1 of 7

# Information from the SDS

**OSHA Hazards**  
Target Organ Effect, Harmful by ingestion., Teratogen

**Target Organs**  
Liver, Cardiovascular system., Eyes, Kidney, Central nervous systemCentral nervous system, Kidney, Eyes,  
Cardiovascular system., Liver



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# Information from the SDS

## GHS Classification

Acute toxicity, Oral (Category 4)

Eye irritation (Category 2B)

## GHS Label elements, including precautionary statements

Pictogram



Warning

Signal word

Hazard statement(s)

H302

H320

Harmful if swallowed.

Causes eye irritation.

Precautionary statement(s)

P305 + P351 + P338

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Where did  
the other  
pictograms  
come from?

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# From the labeling guidelines



Skin corrosion  
Serious eye damage/  
Eye irritation



Carcinogen  
Respiratory sensitizer  
Reproductive toxicity  
Target organ toxicity  
Mutagenicity  
Aspiration Hazard

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# What is this stuff?

## Ethylene Glycol

CAS# 107-21



### Warning

#### Hazards:

Harmful if swallowed. Causes eye irritation

#### Precautions:

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep container tightly closed in a dry and well ventilated place. Hygroscopic.

#### Personal Protective Equipment



#### Target Organs



OMG!!!

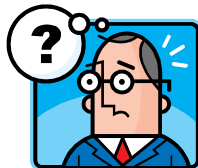
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# What do you know?

- ▶ The real question is if you are having difficulty with any of this, can you imagine how (or what) your employees feel (or know)?



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## What does this mean?

- ▶ Example was meant to:
  - Show that current knowledge may not be enough.
  - Remember “Prop 65”?
  - Not as straight forward as you think.



## Brief History & Overview of GHS

- ▶ The following are excerpts from “standard” GHS overview slides.



## What is GHS?

The GHS is an acronym for *The Globally Harmonized System of Classification and Labeling of Chemicals*.

The GHS is a system for standardizing and harmonizing the classification and labeling of chemicals. It is a logical and comprehensive approach to:

- Defining health, physical and environmental hazards of chemicals;
- Creating classification processes that use available data on chemicals for comparison with the defined hazard criteria; and
- Communicating hazard information, as well as protective measures, on labels and Safety Data Sheets (SDS).



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## Why the Change to Haz Com?

- ▶ To align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) adopted by 67 nations
- ▶ To provide a common and coherent approach to classifying chemicals
  - Reduce confusion and increase understanding of the hazards
  - Facilitate training
  - Help address literacy problems



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## Who is Affected?

- ▶ Manufacturers, Distributors, Importers
  - Change SDS information and format
  - Change container labeling
- ▶ Employers
  - Training employees on changes to:
    - SDS (change from MSDS to SDS and 16-section format)
    - Container Labels (including secondary containers)
- ▶ Employees
  - Recognize and understand hazards based on:
    - Information in new SDS format
    - Pictograms on container labels
  - Precautionary and hazard statements

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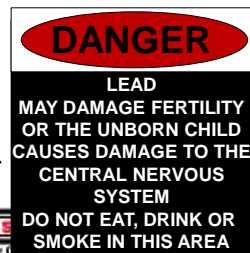


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## Other Standards Affected – Health (signage requirements)

- ▶ Asbestos
- ▶ Carcinogens
- ▶ Vinyl Chloride
- ▶ Inorganic Arsenic
- ▶ Lead
- ▶ Cadmium
- ▶ Benzene
- ▶ Coke Oven Emissions
- ▶ Acrylonitrile
- ▶ Ethylene Oxide
- ▶ Formaldehyde
- ▶ Methylenedianiline



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## Other Standards Affected

- ▶ Flammable and Combustible Liquids
- ▶ Spray Finishing using Flammable and Combustible Materials
- ▶ Process Safety Management of Highly Hazardous Chemicals (PSM)
- ▶ Hazardous Waste and Emergency Response (HAZWOPER)
- ▶ Hazardous Work In Laboratories
- ▶ Dipping and Coating Operations
- ▶ Welding, Cutting and Brazing
- ▶ Employee Medical Records and Trade Secrets

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## Effective Dates and Requirements

Effective Completion Date	Requirement(s)	Responsible Party
December 1, 2013	Train employees on the new label elements and SDS format	Employers
June 1, 2015	Compliance with all modified provisions of the final rule except:	Chemical manufacturers, importers, distributors, and employers
December 1, 2015	The distributor shall not ship containers labeled by the chemical manufacturer or importer unless it is a GHS label	Distributor
June 1, 2016	Update alternative workplace labeling and hazard communication program as necessary, and provide additional employee training for newly identified hazards [and affected vertical standard specific signage]	Employer

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## My Pet Peeve

- ▶ When does 0 = 5?



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## HMIS/NFPA vs GHS

### ▶ HMIS/NFPA

- ▶ 0 Minimal Hazard
- ▶ 1 Slight Hazard
- ▶ 2 Moderate Hazard
- ▶ 3 Serious Hazard
- ▶ 4 Severe Hazard

### ▶ GHS Hazard Categories

- ▶ 1 Severe Hazard
- ▶ 2 Serious Hazard
- ▶ 3 Moderate Hazard
- ▶ 4 Slight Hazard
- ▶ 5 Minimal Hazard

**Zero = Five**

If you see a label, be sure you know if it is a GHS label or an HMIS/NFPA label

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## What do you need to be doing?

### – Contractors.....

1. Recognize that HAZCOM 2012 AKA GHS is Oh Sh!t if you haven't started getting ready.
2. Assuming you have not started:
  - Figure out who needs to be trained?
  - Determine the effort required to train affected employees.
3. Define the training curriculum appropriate to your employees' needs.

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## What do you need to be doing?

### – Suppliers/Distributors.....

1. Determine if you need to create the new SDS or can get it from your supplier.
  - If you need to create SDS's determine how you are going to do this (e.g. software package, contract it out, etc.)
2. Determine which labels need to be updated and how to do this.

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## What do you need to be doing?

### – Suppliers/Distributors.....

3. Determine how you will control your inventory to meet the deadlines.
4. Plan on logistics and expenses to send out new SDS's to all your customers.



End of Part 1





# GHS – 12/1/13

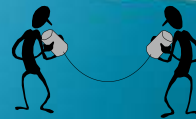
## What do you need to communicate?

Understanding HAZCOM

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## Agenda

- ▶ Organization of the Standard
- ▶ Training Requirements
- ▶ Hazard Classes
- ▶ Mixtures
- ▶ Hazard Classes Not Otherwise Classified
- ▶ Sample “Acute Toxicity”
- ▶ The New Label
- ▶ SDS Format
- ▶ Reference Slides (FYI)



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## Organization of the Final Rule

- |   |                                      |
|---|--------------------------------------|
| a) Purpose                              | g) Safety Data Sheets                |
| b) Scope and Application                | h) Employee Information and Training |
| c) Definitions                          | i) Trade Secrets                     |
| d) Hazard Classification                | j) Effective Dates                   |
| e) Written Hazard Communication Program | Appendices A–F                       |
| f) Labels and Other Forms of Warning    |                                      |

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## Appendices

- Appendix A, Health Hazard Criteria (Mandatory) (NEW)
- Appendix B, Physical Hazard Criteria (Mandatory) (NEW)
- Appendix C, Allocation of Label Elements (Mandatory) (NEW)
- Appendix D, Safety Data Sheets (Mandatory) (NEW)
- Appendix E, Definition of “Trade Secret” (Mandatory)
- Appendix F, Guidance for Hazard Classifications re: Carcinogenicity (Non–Mandatory) (NEW)

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## HAZCOM 2012 12/1/13 Deadline

- ▶ Understand the new label
- ▶ Understand SDS's

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## Training Requirements More than a sign in sheet.



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# Training Requirements

Understand the Following on Labels:

- ▶ Product Identifier
- ▶ Signal Word
- ▶ Pictogram
- ▶ ***Hazard Statements***
- ▶ Precautionary Statements
- ▶ Contact Information (manufacturer etc.)



# Training Requirements

Understanding Labels:

- ▶ How the labels are used in a workplace.
- ▶ How the parts of the label work together.

SDS Training to Include:

- ▶ Understanding the 16 Part Format
- ▶ Relationship of SDS to Label



## OSHA Statement (key points)



### All Training Must:

- ▶ Be presented in a manner that employees can understand.
- ▶ Be presented in a language that is understood.
- ▶ Training must take into account literacy level of employees.

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## Hazard Classes



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# Hazard Classification

(health, physical, environmental)

- Manufacturers are still responsible for determining the hazards of the chemicals they produce or import.
- Classification (similar to hazard determination) is based on the full range of available information. The procedures for determining if the manufacturer has properly performed the hazard classification are provided in Appendix A (health) and Appendix B (physical).

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# HazCom 2012: Mixtures

- The GHS has a tiered approach to mixtures, with each health hazard class having a specific approach.
  - » Step 1: Use available test data on the mixture as a whole to classify the mixture based on the substance criteria.
  - » Step 2: Use bridging principles to extrapolate from other data (e.g., dilution principle).
  - » Step 3: Estimate hazards based on known information regarding the ingredients of the mixture (cut-offs may be applied).
  - » Except for chronic health hazards.

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# PHYSICAL HAZARDS

EXPLOSIVES	FLAMMABLE GASES
FLAMMABLE AEROSOLS	OXIDIZING GASES
GASES UNDER PRESSURE	FLAMMABLE LIQUIDS
FLAMMABLE SOLIDS	SELF-REACTIVE SUBSTANCES
PYROPHORIC LIQUIDS	PYROPHORIC SOLIDS
SELF-HEATING SUBSTANCES	SUBSTANCES which, in contact with water, emit flammable gases
OXIDIZING LIQUIDS	OXIDIZING SOLIDS
ORGANIC PEROXIDES	CORROSIVE TO METALS

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## Physical Hazards

Hazard Class	Hazard Category						
Explosives	Unstable Explosives	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6
Flammable Gases	1	2					
Flammable Aerosols	1	2					
Oxidizing Gases	1						
Gases under Pressure Compressed Gases Liquefied Gases Refrigerated Liquefied Gases Dissolved Gases	1						
Flammable Liquids	1	2	3	4			
Flammable Solids	1	2					
Self-Reactive Chemicals	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Pyrophoric Liquids	1						
Pyrophoric Solid	1						
Pyrophoric Gases	Single category						
Self-heating Chemicals	1	2					
Chemicals, which in contact with water, emit flammable gases	1	2	3				
Oxidizing Liquids	1	2	3				
Oxidizing Solids	1	2	3				
Organic Peroxides	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Corrosive to Metals	1						
Combustible Dusts	Single category						

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## Health Hazard Classification

- ▶ The list of chemicals presenting a 'Health' hazard was deleted from the current HCS and the proposed HCS has identified a new listing
- ▶ A 'Health Hazard' means a chemical which is classified as posing one of the following hazardous effects:

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## GHS Hazard Classification

- Acute Toxicity (any route of exposure)
- Skin Corrosion or Irritation
- Serious Eye Damage or Eye Irritation
- Respiratory or Skin Sensitization
- Germ Cell Mutagenicity
- Carcinogenicity
- Reproductive Toxicity
- Specific Target Organ Toxicity (single or repeated exposure)
- Aspiration Hazard

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# Health Hazards

Hazard Class	Hazard Category			
Acute Toxicity	1	2	3	4
Skin Corrosion/ Irritation	1A	1B	1C	2
Serious Eye Damage/ Eye Irritation	1	2A	2B	
Respiratory or Skin Sensitization	1			
Germ Cell Mutagenicity	1A	1B	2	
Carcinogenicity	1A	1B	2	
Reproductive Toxicity	1A	1B	2	Lactation
STOT – Single Exposure	1	2	3	
STOT – Repeated Exposure	1	2		
Aspiration	1			
Simple Asphyxiants	Single Category			

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## Hazards not Otherwise Classified

Simple Asphyxiant and Pyrophoric Gas  
Combustible Dust

- “Simple asphyxiant” means a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
- “Pyrophoric gas” means a chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.
- “Combustible dust” is covered separately

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## An example of classification and labeling under the GHS

# Acute toxicity



## Standard Label Elements: Acute Toxicity

Hazard category	Symbol	Signal Word	Hazard statement
1	Skull and cross-bones	Danger	Fatal if swallowed (oral)  Fatal in contact with skin (dermal)  Fatal if inhaled (gas, vapor, dust, mist)



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## Standard Label Elements: Acute Toxicity

Hazard category	Symbol	Signal Word	Hazard statement
2	Skull and cross-bones	Danger	Fatal if swallowed (oral)  Fatal in contact with skin (dermal)  Fatal if inhaled (gas, vapor, dust, mist)

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## Standard Label Elements: Acute Toxicity

Hazard category	Symbol	Signal Word	Hazard statement
3	Skull and cross-bones	Danger	Toxic if swallowed (oral)  Toxic in contact with skin (dermal)  Toxic if inhaled (gas, vapor, dust, mist)

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# Acute Toxicity 1 vs. 2 vs. 3

- ▶ What was the difference between the 3 categories?



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## *Classification criteria for acute toxicity*

Acute toxicity	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5
Oral (mg/kg)	5	50	300	2000	<b>Criteria:</b> <ul style="list-style-type: none"> <li>- Anticipated oral LD50 between 2000 and 5000 mg/kg</li> <li>- Indication of significant effect in human</li> <li>- Any mortality at class 4</li> <li>- Significant clinical signs at class 4</li> <li>- Indications from other studies</li> </ul>
Dermal (mg/kg)	50	200	1000	2000	
Gases (ppm)	100	500	2500	5000	
Vapours (mg/l)	0,5	2,0	10	20	
Dust and mists (mg/l)	0,05	0,5	1,0	5	



## Standard Label Elements: Acute Toxicity

Hazard category	Symbol	Signal Word	Hazard statement
4	Exclamation point	Warning	<p>Harmful if swallowed (oral)</p> <p>Harmful in contact with skin(dermal)</p> <p>Harmful if inhaled (gas, vapor, dust, mist)</p>

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## Standard Label Elements: Acute Toxicity

Hazard category	Symbol	Signal Word	Hazard statement
5	No symbol	Warning	<p>May be harmful if swallowed (oral)</p> <p>May be harmful in contact with skin (dermal)</p> <p>May be harmful if inhaled (gas, vapor, dust, mist)</p>

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**Touffain (Content: 932)**

**Danger! Toxic if Swallowed, Flammable Liquid and Vapor**

Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/spark/open flame - no smoking. Wear protective gloves and respiratory protection. Ground container and handling equipment. Use explosion-proof electrical equipment. Take precautions to prevent static discharge. The only non-sparking metal filter is made with stainless steel.

**IF SWALLOWED:** Immediately call a POISON CENTER or doctor/physician. Do not vomit. In case of fire, use water fog only directed, CO<sub>2</sub>, or "halon" type.

See Material Safety Data Sheet for full details regarding safe use of this product.


McCombs, 1800001, MyTown, NJ 08000, Tel: 404 893 1808


# GHS Labels


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## GHS Labels

- ▶ Three standardized GHS label elements:
  - Symbols (Hazard Pictograms) that convey health, physical, and environmental hazard information assigned to a GHS hazard class and category
  - Signal Words “**Danger**” or “**Warning**” used to emphasize hazards and relative level of severity of the hazard and assigned to a GHS hazard class and category
  - Hazard Statements which are standard phrases assigned to a hazard class and category that describe the nature of the hazard

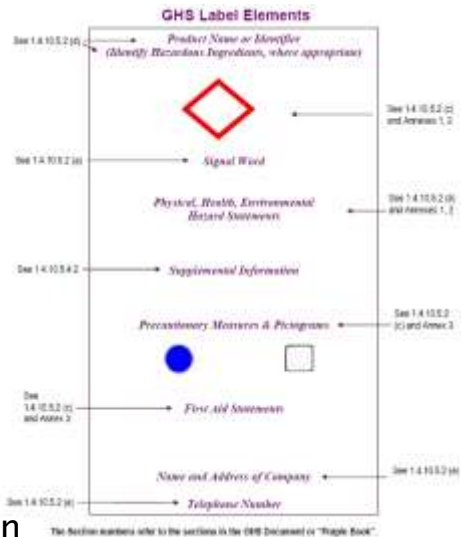



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# GHS Labels

- ▶ Key Elements
  - Product Identifier
  - Supplier Identifier
  - Chemical Identity
  - Hazard Pictograms\*
  - Signal Words\*
  - Hazard Statements\*
  - Precautionary Information
- \* Standardized



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## GHS Labels

GHS Pictograms and Hazard Classes		
• Oxidizers	• Flammable • Self-Heating • Pyrophoric • Self-Heating • Easily Flammable Gas • Organic Peroxides	• Explosives • Self-Heating • Organic Peroxides
• Acute toxicity (severe)	• Corrosive	• Gas Under Pressure
• Carcinogenic • Reproductive Toxicity • Target Organ Toxicity • Mutagenicity • Aspiration Toxicity	• Environmental Toxicity	• Irritant • Dermally Sensitizer • Acute toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritation

Red  
border  
GHS  
-----  
Black  
border  
Transport

Transport "Pictograms"		
Flammable Liquid Flammable Gas Flammable Aerosol	Flammable solid Self-Heating Substances	Pyrophorics (Spontaneously Combustible) Self-Heating Substances
Infectious, which in contact with water, emit flammable gases (Gaseous When Wet)	Oxidizing Gases Oxidizing Liquids Oxidizing Solids	Explosive Division 1.1, 1.2, 1.3
Explosive Division 1.4	Explosive Division 1.5	Explosive Division 1.6
Compressed Gases	Acute Toxicity (Oral, Dermal, Inhalation)	Corrosive
Marine Pollutants	Organic Peroxides	





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## GHS Labels

Table 2: GHS Label Elements for Flammable (and Combustible) Liquids

Symbol	Category 1	Category 2	Category 3	Category 4
				No symbol
Signal Word	Danger	Danger	Warning	Warning
Hazard Statement	Extremely flammable liquid and vapor	Highly flammable liquid and vapor	Flammable liquid and vapor	Combustible liquid

ACUTE ORAL TOXICITY – Annex 1					
	Category 1	Category 2	Category 3	Category 4	Category 5
LD <sub>50</sub>	≤ 5 mg/kg	> 5 < 50 mg/kg	≥ 50 < 300 mg/kg	≥ 300 < 2000 mg/kg	≥ 2000 < 5000 mg/kg
Pictogram					No symbol
Signal word	Danger	Danger	Danger	Warning	Warning
Hazard statement	Fatal if swallowed	Fatal if swallowed	Toxic if swallowed	Harmful if swallowed	May be harmful if swallowed

GHS Pictograms and Hazard Classes		
 • Oxidizing	 • Flammable • Self-Heating • Pyrophoric • Self-Heating • Extremely Flammable Gas • Organic Peroxide	 • Explosive • Self-Heating • Organic Peroxide
 • Acute toxicity (various)	 • Corrosive	 • Gas Under Pressure
 • Cartridges • Reproductive Toxicity • Target Organ Toxicity • Mutagenicity • Aspiration Toxicity	 • Environmental Toxicity	 • Irritant • Dermal Irritation • Acute toxicity (Harmful) • Skin Irritation • Respiratory Tract Irritation

Hazard Classes may have 'Categories'



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## GHS Labels

Figure 4.12 Example GHS Inner Container Label (e.g., bottle inside a shipping box)

	<b>ToxiFlam (Contains: XYZ)</b>	
<b>Danger! Toxic If Swallowed, Flammable Liquid and Vapor</b>		
<p>Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. – No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Use only non-sparking tools. Store in cool/well-ventilated place.</p>		
<p><b>IF SWALLOWED:</b> Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth. In case of fire, use water fog, dry chemical, CO<sub>2</sub>, or "alcohol" foam.</p>		
<p>See Material Safety Data Sheet for further details regarding safe use of this product</p>		
<p>MyCompany, MyStreet, MyTown, NJ 00000, Tel: 444 999 9999</p>		



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# GHS Labels

Figure 4.15 Example GHS Outer Container Label (55 gallon/200 liter drum)









<p><b>ToxiFlam</b></p> <p><b>Danger! Toxic If Swallowed</b></p> <p><b>Flammable Liquid and Vapor</b></p> <p>Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. – No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Use only non-sparking tools. Store in cool/well-ventilated place.</p> <p><b>IF SWALLOWED:</b> Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth.</p> <p>In case of fire, use water fog, dry chemical, CO<sub>2</sub>, or “alcohol” foam.</p> <p>See Material Safety Data Sheet for further details regarding safe use of this product.</p> <p>MyCompany, MyStreet, MyTown NJ 00000, Tel: 444 999 9999</p>	<p><b>Flammable liquids, toxic, n.o.s.</b> (contains XYZ)</p> <p><b>UN 1992</b></p>	 
---	---	--

## Example of a Transportation and GHS label combined

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# Pictograms on Shipped Containers

Flame	Flame over circle	Exploding bomb
		
Corrosion	Gas cylinder	Skull and crossbones
		
Exclamation mark	Environment	Health Hazard
		

68

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# The New SDS

**SIGMA-ALDRICH**

**Material Safety Data Sheet**

Version 1.1  
Revision Date: 03/04/2013  
Print Date: 03/04/2013

**PRODUCT AND COMPANY IDENTIFICATION**

Product Name:	Ethylene glycol
Product Number:	10000
Brand:	Sigma-Aldrich
Supplier:	Sigma-Aldrich
	3050 Parkway Drive
	St. Louis, MO 63103
	USA
Telephone:	+1 800 421 8000
Fax:	+1 800 421 8000
Emergency Phone # (For	
both supplier and	
manufacturer):	
Preparation Information:	Sigma-Aldrich Corporation
	Product Safety - Americas Region
	+1 800 421 8000

**HAZARD IDENTIFICATION**

**Emergency Overview**

**GHS-Labels:**

**Target Organs:**

Lower Cardiovascular system, Eyes, Kidney, Central nervous system/Control nervous system, Kidney, Skin, Cardiovascular system, Lungs

**GHS Classification:**

Acute toxicity, Oral (Category 4)

Eye irritation (Category 2)

**GHS Label elements, including precautionary statements**

**Pictogram:**

**Signal word:** **Warning**

**Hazard statement(s):**

H302: Harmful if swallowed

H332: Causes eye irritation

**Precautionary statement(s):**

P301 + P312: IF SWALLOWED: Rinse mouth with water for several minutes. Remove contact lenses, if present, carefully, if feasible. Continue rinsing.

**Other Information:**


Health hazard:	2
Climate hazard:	1
Flammability:	1
Physical hazard:	0

**OECD Rating:**

Health hazard:	2
Flam:	1

Print Date: 03/04/2013

Page 1 of 1



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# SDS Format

**Section**

- 1: Product Identifier
- 2: Hazard Identification
- 3: Components
- 4: First Aid
- 5: Firefighting
- 6: Accidental Release Measures
- 7: Handling and Storage
- 8: Personal Protective Equipment

**Section**

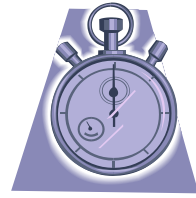
- 9: Physical and Chemical Properties
- 10: Stability and Reactivity
- 11: Toxicological Information
- 12: Ecological Information
- 13: Disposal Considerations
- 14: Transportation Information
- 15: Regulatory Information
- 16: Other information



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So are you ready?

✓  
Ready



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End of Part 2



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72



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## Reference Slides

The following slides are additional information to supplement this talk.



# Flame over Circle

- ▶ Oxidizers



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# Flame

- ▶ Flammables
- ▶ Pyrophorics
- ▶ Self-Heating
- ▶ Emits Flammable Gas
- ▶ Self-Reactives
- ▶ Organic Peroxides



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# Exploding Bomb

- Explosives
- Self-Reactives
- Organic Peroxides



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# Skull and Crossbones

- ▶ Acute Toxicity (fatal or toxic)



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# Corrosion

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



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# Gas Cylinder

- Gases Under Pressure



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# Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity



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# Environment

- ▶ Aquatic Toxicity
  - (Non-Mandatory)



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## Exclamation Mark

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



## “MATERIAL” SAFETY DATA SHEET

- ▶ Material Safety Data Sheets (MSDSs) provide detailed health and safety information and precautions for handling hazardous substances, including emergency and first aid procedures.



## “MATERIAL” SAFETY DATA SHEETS

- ▶ Identity of the chemical or product
- ▶ Hazardous ingredients
- ▶ Physical/chemical characteristics
- ▶ Fire and explosion hazards
- ▶ Reactivity data
- ▶ Health hazards
- ▶ Precautions for safe handling and use
- ▶ Control measures

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## Change of Name to “Safety Data Sheets”

- ▶ Should provide a clear description of the data used to identify the hazards
- ▶ If info is not applicable or not available, it should be stated
  - Minimum Information for an SDS
  - From GHS R3 Table 1.5.2

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# Section 1: Product Identifier

- ▶ To include
  - GHS product identifier
    - Other means of identification
  - Recommendations for use
  - Restrictions on use
  - Manufacturer or distributor
  - Address and phone
  - Emergency telephone



# Section 2: Hazard Identification

- ▶ Hazard Identification
  - GHS classification of the substance
  - Labeling elements
  - Signal words and precautionary measures
  - May have pictograms
  - Other hazards which do not result in classification
    - (dust explosion hazards)





## Section 3: Components

### ▶ Chemical Ingredients

- Common name, synonyms, CAS Registry Number
- Have to list hazardous chemicals if in concentrations above 1%
- Have to list carcinogens if in concentrations above 0.1%
- Trade secrets are allowed



## Section 4: First Aid

- ▶ Description of necessary measures, subdivided according to the different routes of exposure
- ▶ Most important symptoms, and effects
- ▶ Type of treatment
  - Indication of immediate medical attention and special treatment needed



## Section 5: Firefighting

- ▶ Suitable and unsuitable extinguishing media
- ▶ Specific hazards arising from the chemical
- ▶ Protective equipment and precautions for firefighters



## Section 6: Accidental Release Measures

- ▶ Personal precautions, protective equipment and emergency procedures
- ▶ Environmental precautions
- ▶ Proper methods of containment and cleanup



## Section 7: Handling and Storage

- ▶ Precautions for safe handling and storage
- ▶ Incompatibilities



## Section 8: Personal Protective Equipment

- ▶ PELs
- ▶ TLVs
- ▶ Engineering Controls
- ▶ Individual protection measures, such as PPE



## Sections 9: Physical and Chemical Properties

- ▶ Appearance
- ▶ Odor
- ▶ Odor threshold
- ▶ pH
- ▶ Melting point/freezing point
- ▶ Initial boiling point and boiling range
- ▶ Flash point
- ▶ Evaporation rate
- ▶ Flammability
- ▶ Upper and lower flammability or explosive limits
- ▶ Vapor pressure
- ▶ Vapor density
- ▶ Solubility
- ▶ Auto ignition temp



## Section 10: Stability and Reactivity

- ▶ Chemical stability
- ▶ Possibility of hazardous reactions
- ▶ Conditions to avoid
- ▶ Incompatible materials
- ▶ Hazardous decomposition products



## Section 11: Toxicological Information

- ▶ Information on the likely routes of exposure
- ▶ Symptoms related to the physical, chemical and toxicological characteristics
- ▶ Delayed and immediate effects and chronic effects from short and long term exposure
- ▶ Estimates of toxicity
  - LD<sub>50</sub>
  - LC<sub>50</sub>



## Section 12: Ecological Information

- ▶ Not mandatory
- ▶ Ecotoxicity
- ▶ Persistence and degradability
- ▶ Bioaccumulative potential
- ▶ Mobility in soil



## Section 13: Disposal Considerations

- ▶ Section 13: disposal considerations
  - Description of waste residues
  - Methods of disposal
  - Safe handling



## Section 14: Transportation Information

- ▶ Section 14: Transport Information
  - UN Number and proper shipping name
  - Transport Hazard Classes
  - Packing Group
  - Special precautions
- ▶ Sections 1–11 are mandatory, 12–16 not



## Sections 15 and 16

- ▶ Section 15: Regulatory Information
  - Safety, health and environmental regulations specific for the product
- ▶ Section 16 Other information
  - Revision date



## Other Affected Standards



## Approach to Other Standards

- Many other OSHA standards contain criteria related to defining hazards, as well as other provisions that rely on those criteria.
- OSHA undertook a comprehensive review of its rules to identify what needed to be changed.
- OSHA has proposed modifications to all of those standards that it determined needed to be consistent with the GHS.

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## Health Standards

- The substance-specific standards generally pre-date the HCS, and do not have a comprehensive approach to hazard communication.
- The final rule references HazCom 2012 in each of these standards to ensure they have all the protections of the rule.

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## Health Standards cont.

- In addition, OSHA updated the provisions regarding what is to be communicated to workers to ensure the health effects are consistent with the GHS criteria.
- Regulated area signs will need to be updated to reflect the new language.
- Employers have until June 1, 2016 to update the signs.

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## Substance-Specific Health Standards

Standard	Substance	Original signs	Final Changes
1910.1001 1915.1001	Asbestos Regulated areas Where the use of respirators and protected clothing is required	DANGER ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA	DANGER ASBESTOS MAY CAUSE CANCER CAUSES DAMAGE TO LUNGS AUTHORIZED PERSONNEL ONLY WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

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## Health Standards

- Asbestos (1910.1001; 1926.1101; 1915.1001)
- 13 Carcinogens (1910.1003)
- Vinyl Chloride (1910.1017)
- Inorganic Arsenic (1910.1018)
- Lead (1910.1025; 1926.62)
- Chromium (VI) (1910.1026; 1926.1126; 1915.1026)
- Cadmium (1910.1027; 1926.1127)
- Benzene (1910.1028)
- Coke Oven Emissions (1910.1029)
- Cotton Dust (1910.1043)
- 1,2-dibromo-3-chloropropane (1910.1044)
- Acrylonitrile (1910.1045)
- Ethylene Oxide (1910.1047)
- Formaldehyde (1910.1048)
- Methylenedianiline (1910.1050; 1926.60)
- 1,3-Butadiene (1910.1051)
- Methylene Chloride (1910.1052)
- Occupational exposure to hazardous chemicals in laboratories (1910.1450)

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## Safety Standards

- OSHA updated a number of safety standards to be consistent with the criteria in the HazCom 2012.
- The manner in which this was done depended on the provisions of the standard being considered, and approaches varied.

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## Safety Standards cont.

- In some cases, it was decided that changes could not be made at this time given the source of the standard or other constraints.
- OSHA sought to minimize the impact on the scope or substantive provisions of the standards that were updated.

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## Safety Standards PSM 1910.119(a)(1)(ii)

### HazCom 1994

- ▶ A process which involves a flammable liquid or gas (as defined in 1910.1200(c) of this part) on site in one location, in a quantity of 10,000 pounds (4535.9 kg) or more except for:

### HazCom 2012

- ▶ A process which involves a *Category 1* flammable gas (as defined in 1910.1200 (c)) or a flammable liquid *with a flashpoint below 100 °F (37.8 °C)* on site in one location, in a quantity of 10,000 pounds (4535.9 kg) or more except for:

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# Safety Standards

- Flammable Liquids (1910.106; 1926.52)
- Spray finishing using flammable and combustible materials (1910.107)
- Process safety management of highly hazardous chemicals (1910.119; 1926.64)
- Hazardous waste operations and emergency response (1910.120; 1926.65)
- Dipping and coating operations: Coverage and definitions (1910.123)
- General requirements for dipping and coating operations (1910.124)
- Additional requirements for dipping and coating operations that use flammable liquids or liquids with flashpoints greater than 199.4 °F (93 °C) (1910.125)
- Welding, Cutting, and Brazing (1910.252)

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