

# 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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## 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?



## 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?



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

**FLAMMABLE - KEEP FIRE AWAY**  
USE ONLY IN WELL VENTILATED AREAS.

**This is very straight forward.**

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**

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Is this dangerous for your employees?

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**

**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** **CODE NUMBERS**



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**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?



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?

The image shows a yellow GHS hazard label for Ethylene Glycol. At the top is a diamond-shaped hazard pictogram with the number '1' in the center and '1' and '0' in the top-left and top-right corners respectively. Below the pictogram, the text reads: **Ethylene Glycol**, 1,2-dihydroxyethane; 1,2-ethanediol; ethylene alcohol; glycol alcohol. The hazard category is **CAUTION IRRITANT**. The label includes sections for **Emergency Overview**, **Precautionary Measures**, **First Aid Procedures**, and **Fire Procedures**. The CAS No. 107-21-1 is listed at the bottom right of the label.

**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?

The image shows a white GHS hazard label with a black border. At the top are three hazard pictograms: a red diamond with a black exclamation mark, a red diamond with a black hand being washed, and a red diamond with a black silhouette of a person. Below the pictograms is the word **Warning**. The label includes sections for **Hazards**, **Precautions**, **Personal Protective Equipment**, and **Target Organs**. A large red watermark reading "Where did this information come from?" is overlaid diagonally across the label. The CAS No. 107-21-1 is listed at the bottom right of the label.

**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 generation of vapor or mist. Keep container tightly closed in a cool and well ventilated place. Hygroscopic.

**Personal Protective Equipment:**

**Target Organs:**

CAS No. 107-21-1

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# Information from the SDS

SIGMA-ALDRICH

Material Safety Data Sheet

Version 1.1  
Revision Date 02/28/2011  
Print Date 02/28/2011

## V. PRODUCT AND COMPANY IDENTIFICATION

Product Name	[REDACTED]
Product Number	104759
Manufacturer	Sigma-Aldrich
Supplier	Sigma-Aldrich 300 Service Street St. Louis, MO 63103 USA
Telephone	+1 800.325.6933
Fax	+1 800.325.6933
Emergency Phone # (For 24-hr supplier and manufacturer)	(314) 774-0000
Prevention Information	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-325-6933

## X. 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)	
Corrosion (Category 2)	
OSHA Label elements, including precautionary statements	
Pictogram	
Signal word	Warning
Hazard statements	
H302	Harmful if swallowed
H332	Irritates eyes
Precautionary statements	
P201 + P202 + P203	IF IN EYES: 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 2

Flammability 2

Reactivity 2

OSHA Label

Health Hazard 2

Physical Hazard 2

Flammability 2

Reactivity 2



# 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



# Information from the SDS

GHS Classification  
 Acute toxicity, Oral (Category 4)  
 Eye irritation (Category 2B)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

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?



# From the labeling guidelines



Skin corrosion  
 Serious eye damage/  
 Eye irritation



Carcinogen  
 Respiratory sensitizer  
 Reproductive toxicity  
 Target organ toxicity  
 Mutagenicity  
 Aspiration Hazard



# 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!!!

# 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)?



## 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.



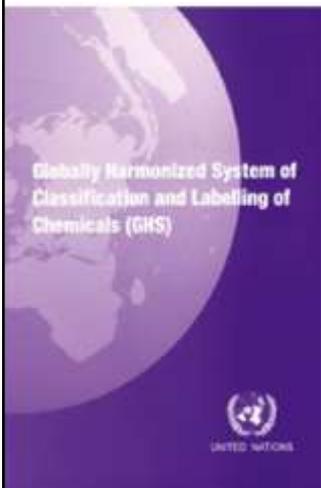
## Brief History & Overview of GHS

- ▶ 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).

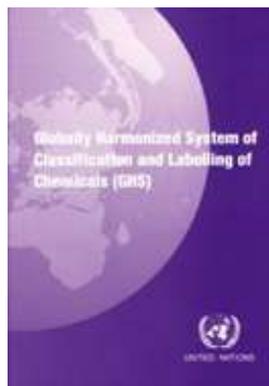
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## Why the Change to Haz Com?

- ▶ 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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## 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?



## 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

## 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.



## 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.



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

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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



Training Requirements  
More than a sign in sheet.

# 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.

Three hazard pictograms are arranged around the central text. The top-left pictogram shows a dead tree and a dead fish, representing environmental damage. The top-right pictogram shows a silhouette of a person with a starburst on their chest, representing health hazards. The bottom-right pictogram shows an exploding bomb, representing explosive hazards. The central text "Hazard Classes" is in a large, grey, sans-serif font. The background features a blue and black gradient at the bottom.

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						
	Unstable Explosives	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6
Explosives							
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			
	1	2	3	4
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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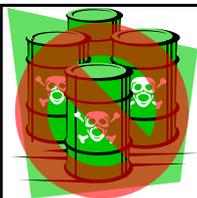
## Hazards not Otherwise Classified

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> - Anticipated oral LD50 between 2000 and 5000 mg/kg - Indication of significant effect in human - Any mortality at class 4 - Significant clinical signs at class 4 - Indications from other studies
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	Harmful if swallowed (oral)  Harmful in contact with skin(dermal)  Harmful if inhaled (gas, vapor, dust, mist)

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## Standard Label Elements: Acute Toxicity

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

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Tetrafluoroethylene (K02)

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

Do not eat, drink or use tobacco while using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat, open flames, fire - see heading. Wear protective gloves and respiratory protection. Ground container and handling equipment. Use explosion-proof electrical equipment. Take precautions to prevent static electricity. The only acceptable method is to conduct to ground through a device.

**IF SWALLOWED:** Immediately call a POISON CENTER or doctor/physician. Have victim lie on their side. Do not induce vomiting. Do not give anything by mouth to someone who is unconscious or "passed out".

See Material Safety Data Sheet for full details regarding safe use of this product.  
 MyCompany, 12345 Ave., MyTown, AL 00000, Tel: 444 888 8888

# GHS Labels



## 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

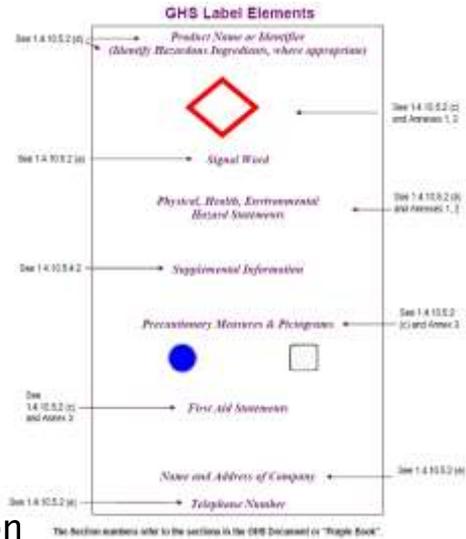
GHS Pictograms and Signal Words		



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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 • Prohibited • Self-Heating • Easily Flammable Gas • Organic Peroxides	• Explosives • Self-Reacting • Organic Peroxides
• Acute toxicity (severe)	• Corrosive	• Gas Under Pressure
• Carcinogen • Respiratory Sensitizer • Reproductive Toxicity • Target Organ Toxicity • Mutagenicity • Aquatic Toxicity	• Environmental Toxicity	• Irritant • Derm. Sensitizer • Acute toxicity (harmful) • Narcotic Effect • Respiratory Tract Irritation

Red border  
GHS  
-----  
Black border  
Transport

European "Pictograms"		
Flammable Liquid Flammable Gas Flammable Aerosol	Flammable Solid Self-Reacting Substances	Propagator (Spontaneously Combustible) Self-Heating Substances
Toxic, which in contact with water, emit flammable gases (Gaseous Under Water)	Oxidizing Gas Oxidizing Liquid Oxidizing Solid	Explosive - Division 1.1, 1.2, 1.3
Toxic Division 1, 4	Toxic Division 1, 2	Toxic Division 1, 4
Compressed Gas	Acute Toxicity (Oral, Dermal, Inhalation)	Corrosive
Marine Pollutant	Organic Peroxide	

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# GHS Labels

Table 2. GHS Label Classes 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 < 49 mg/kg	≥ 49 < 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 Heated • Pyrophoric • Self Heating • Extremely Flammable Gas • Organic Peroxide	 • Explosive • Self Heated • Organic Peroxide
 • Acute toxicity (various)	 • Corrosive	 • Gas Under Pressure
 • Cartridge • Reproductive Toxicity • Reproductive Toxicity • Target Organ Toxicity • Mutagenicity • Aspiration Toxicity	 • Environmental Toxicity	 • Irritant • Dermal Sensitizer • Acute toxicity (various) • Harmful to Aquatic Life • 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)

**ToxiFlam (Contains: XYZ)**

**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/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.

**IF SWALLOWED:** 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.

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

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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/spark/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></p> <p><b>(contains XYZ)</b></p> <p><b>UN 1992</b></p>	 
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## 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

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# The New SDS

SIGMA-ALDRICH

Material Safety Data Sheet  
Version 1.1  
Revision Date 03/08/2013  
Print Date 03/08/2013

**1 PRODUCT AND COMPANY IDENTIFICATION**

Product Name:	Ethylene glycol
Product Number:	02870
Brand:	Sigma-Aldrich
Supplier:	Sigma-Aldrich 3050 Service Drive St. Louis, MO 63103
Telephone:	USA +1 800 451-9332
Fax:	+1 800 523-8972
Emergency Phone # (For haz. equip. and manufacturers):	USA +1 800 371-0000
Preparation Information:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-523-8972

**2 HAZARD IDENTIFICATION**

**Signal word:** Warning

**Hazard statements:**  
H228: Flammable liquid  
H314: Causes severe skin burns and eye damage

**Target Organ:** Respiratory system, Skin, Eyes, Central nervous system/Control nervous system, Kidney, Eye, Cardiovascular system, Lungs

**Label:**  
GHS02: Corrosive  
GHS05: Toxic  
GHS07: Flammable liquid  
GHS09: Environment

**Precautionary statements:**  
P201 + P202: Read all labels before use.  
P231 + P232: Keep container tightly closed to prevent leakage.  
P240: Avoid contact with skin.  
P241: Avoid breathing dusts/fumes/gases/mists/vapors/sprays/aerosols.  
P242: Avoid contact with eyes.  
P243: Avoid contact with water.  
P273: Avoid release into the environment.

**Environmental Precautionary Statements:**  
P501: Dispose of contents and container in accordance with local, state, and federal regulations.

**Physical and Chemical Properties:**  
Hazardous to the environment: Yes  
Hazardous to aquatic life: Yes  
Hazardous to ozone: No  
Hazardous to the environment: No

**Physical and Chemical Properties:**  
Hazardous to the environment: No  
Hazardous to aquatic life: No  
Hazardous to ozone: No  
Hazardous to the environment: No

**Physical and Chemical Properties:**  
Hazardous to the environment: No  
Hazardous to aquatic life: No  
Hazardous to ozone: No  
Hazardous to the environment: No



# SDS Format

- |                                  |                                     |
|----------------------------------|-------------------------------------|
| Section                          | Section                             |
| 1: Product Identifier            | 9: Physical and Chemical Properties |
| 2: Hazard Identification         | 10: Stability and Reactivity        |
| 3: Components                    | 11: Toxicological Information       |
| 4: First Aid                     | 12: Ecological Information          |
| 5: Firefighting                  | 13: Disposal Considerations         |
| 6: Accidental Release Measures   | 14: Transportation Information      |
| 7: Handling and Storage          | 15: Regulatory Information          |
| 8: Personal Protective Equipment | 16: Other information               |





So are you ready?

Ready 

End of Part 2



## Contact information

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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



# Skull and Crossbones

- ▶ Acute Toxicity (fatal or toxic)



# Corrosion

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



# Gas Cylinder

- Gases Under Pressure



# Health Hazard

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



# Environment

- ▶ Aquatic Toxicity
  - (Non-Mandatory)



## 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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