


Collaborative Bachelor's Degree Program of Fire Protection and Safety  
Engineering Technology between Southwest Jiaotong University and  
Oklahoma State University, U.S.A.



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## FPST 2023 Industrial and Occupational Safety

Hazard Communication

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## Objectives



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- Understand applicable OSHA regulation
- Know how to assessment for chemical hazards
- Understand Labels and SDS information
- Know training requirements

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## Hazard Communication History



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- Nov.1983 – First publication
  - Only covered manufacturing sector
  - Final Rule was published on Aug 1987 covering all employers except for the construction industry
- Feb 1990 – Supreme Court decision required enforcement of all regulatory provisions in all industrial segments
- Feb 1994 – Publication of final rule including technical amendments and minor changes
- 29 CFR 1910.1200

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## GHS



- In 2012, OSHA adopted the GHS and revised its 29 year old Hazard Communication (HazCom) regulation
  - Globally
  - Harmonized
  - System
- ...for Classification and Labeling of Chemicals

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## What is GHS?



- It is A SYSTEM. Elements of this system will be adopted by OSHA, to classify and communicate hazards of chemicals based on a common set of criteria
- GHS is a harmonized system for the classification and labeling of chemicals covering health, physical and environmental hazards.
- It provides a basis for the harmonization of regulations related to the handling of chemical materials at a global level.

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## What is GHS?



- GHS establishes
  - Harmonized definitions of hazards
    - Physical, health, environmental
  - Specific criteria for labels
    - Pictograms, signal words, hazard and precautionary statements
  - Harmonized format for safety data sheets
    - 16 sections (ANSI format)

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## HazCom



- 1910.1200(a)
  - Purpose - to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees.
- 1910.1200(b)
  - Scope – worksites where employees could be exposed to hazardous chemicals

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## Target Sectors



- GHS targets these sectors :
  - Workplace
  - Consumers
  - Transport
  - Emergency Responders
- 945,000 hazardous chemical products and 7 million workplaces



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## 1910.1200(c) Definitions Health Hazards



- Acute Toxicity
- Skin corrosion/Irritation
- Serious eye damage/eye irritation
- Respiratory or skin sensitization
- Germ cell mutagenicity
- Carcinogenicity
- Reproductive toxicity
- Target organ system toxicity – Single exposure
- Target organ system toxicity – repeated exposure
- Aspiration hazard



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## 1910.1200(c) Definitions Health Hazards



- *Acute toxicity* “refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours”.
- Substances are assigned to one of five categories
  - Oral
  - Dermal
  - Inhalation – gases
  - Inhalation – vapors
  - Inhalation – dusts and mists



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## 1910.1200(c) Definitions Health Hazards

- *Skin corrosion is defined as “the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis, which was followed by the application of a test substance for up to 4 hours”.*
- GHS does not require additional testing. Based on available data for that chemical
- Corrosive reactions are typified by ulcers, bleeding, bloody scabs.



Visible damage to skin after contact with substance



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## 1910.1200(c) Definitions Health Hazards

- *Skin irritation is defined as “the production of reversible damage to the skin following the application of a test substance for up to 4 hours”.*

OSHA adopted two categories for the Skin Corrosion/ irritation hazard class



Before contact



After contact

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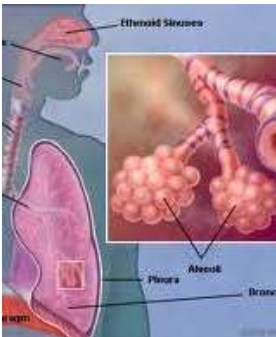




### 1910.1200(c) Definitions Health Hazards



- Skin sensitizer “means a chemical that induces an allergic response following skin contact”.
- Respiratory sensitizer “means a chemical that will lead to hypersensitivity of the airways following inhalation of the chemical”.
  - There are two categories for the Respiratory or Skin Sensitization hazard class



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### 1910.1200(c) Definitions Health Hazards



- Two categories for eye hazards
- Eye irritation is defined as “the production of changes in the eye following the application of test substance to the anterior surface of the eye, which are full reversible within 21 days of application”.



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### 1910.1200(c) Definitions Health Hazards



- Serious eye damage is defined as the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the anterior surface of the eye, which is not fully reversible within 21 days of application”.



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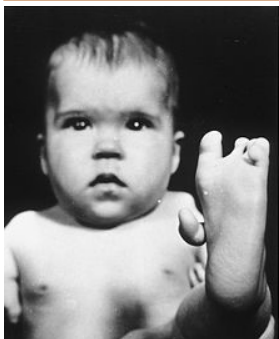
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### 1910.1200(c) Definitions Health Hazards





- Germ Cell Mutagenicity
  - A *mutation* "is defined as a permanent change in the amount or structure of the genetic material in a cell"
  - The term *mutagenic* and *mutagen* "will be used for agents giving rise to an increased occurrence of mutations in populations of cells and/or organisms"
- Two categories
  - 1 – known to induce heritable mutations
  - 2 – concern of the possibility that may induce heritable mutations

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### 1910.1200(c) Definitions Health Hazards



- *Carcinogen* "means a substance or a mixture of substances which induce cancer or increase its incidence."



Skin cancer
- Substances and mixtures which have induced benign and malignant tumors in well-performed experimental studies on animals are considered also to be presumed or suspected human carcinogens.
- Two carcinogen
  - Know or presumed carcinogens
  - Suspected carcinogens



Lung cancer

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### 1910.1200(c) Definitions Health Hazards



- *Reproductive toxicity* "includes adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on development of the offspring" (teratogen).
- *Adverse effects on development of the offspring* means "any effect of chemicals which interferes with normal development of the conceptus either before or after birth".



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### 1910.1200(c) Definitions Physical Hazards

- Explosives
- Flammable gases
- Flammable aerosols
- Oxidizing gases
- Gases under pressure
- Flammable liquids
- Flammable solids
- Self-reactive substances and mixtures
- Pyrophoric liquids
- Pyrophoric solids
- Self-heating substances and mixtures
- Substances and mixtures which, in contact with water, emit flammable gases
- Oxidizing liquids
- Oxidizing solids
- Organic peroxides
- Corrosive to metals



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### 1910.1200(c) Definitions Physical Hazards



- Explosive Substances and Mixtures
  - Solid or liquid substances capable of producing gas at such a high temperature and pressure that it can cause damage to surroundings.
  - Divided in 6 categories based on type of damage produced



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### 1910.1200(c) Definitions Physical Hazards



- Flammables, include
  - Flammable Gases
  - Flammable Aerosols
  - Flammable Liquids
  - Flammable Solids



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### 1910.1200(c) Definitions Physical Hazards





- *Oxidizing gas*
  - "Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does".
  - One category
- *Oxidizing Liquids and Solids*
  - Though not necessarily combustible on their own, generally by yielding oxygen cause or contribute combustion of other materials.
  - Three categories

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### 1910.1200(c) Definitions Physical Hazards





- *Gases Under Pressure*
  - Gases contained in a receptacle at a pressure of 200 kPa (29 psi) or more, which are liquefied or liquefied and refrigerated
- *Four groups*
  - Compressed gases
  - Liquefied gases
  - Dissolved gases
  - Refrigerated liquefied gases

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### 1910.1200(c) Definitions Physical Hazards



- *Corrosive to Metals* "means a chemical which by chemical action will materially damage, or even destroy, metals"
  - One category
- *Organic Peroxides*
  - Organic liquids or solids that can decompose explosively, burn rapidly, be sensitive to friction and react dangerously with other chemicals.
  - 7 categories similar to those in transport sector



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### 1910.1200(c) Definitions Physical Hazards





- Environmental Hazards
  - Hazardous to the Aquatic Environment
  - Acute – injury after short term exposure
  - Chronic – injury during the organism life cycle
- Includes fish, crustaceans, and algae or other aquatic plants
- The environmental hazards are not covered by OSHA . The competent authority for those would be EPA

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### 1910.1200(d) Hazard Classification



- Manufacturers and importers must evaluate the hazards related to chemicals they produce or import
  - Determine hazard class and, if applicable, the category of each class

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### 1910.1200(e) Written Hazard Communication Program



- Employers must inform their employees about the hazards related to chemicals they might be exposed to and the related protective measures.
  - List of hazardous chemicals present
  - Container labeling and other forms of warning
  - Safety Data Sheets (SDS)
  - Employee training

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## 1910.1200(f) Labels and Other Forms of Warning



- Product identifier
- Signal word
- Hazard statement
- Hazard pictogram
- Precautionary statements
- Supplier identifier

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## 1910.1200(f) Labels and Other Forms of Warning



- Product Identifier
  - States the identity of the chemical, including all the ingredients that contribute to the hazard of the mixture
  - According to the HazCom Standard, unlabeled chemical containers are allowed to be used in the workplace when the person who transferred the chemical from the primary container is going to use it only during his shift--then return the contents or properly label the secondary container



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## 1910.1200(f) Labels and Other Forms of Warning



- Chemical identity
  - For Mixtures
    - Identities of all ingredients contributing to health hazards, OR
    - All ingredients that contribute to the hazard of the mixture.

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## 1910.1200(f) Labels and Other Forms of Warning



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✓ Signal Words

- ✓ These words are used to alert the reader of health, physical, and environmental hazards, and the level of severity
  - ✓ **Danger** – most harmful to person, because of toxicity or exposure, more severe or persistent effects
  - ✓ **Warning** - less harmful to person, lower levels of exposure or toxicity or temporary harmful effects
  - ✓ Lower levels of danger or exposure typically used "Caution" or "Notice" as the warning word
- ✓ "Danger" and "Warning" are the only two signal words used



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## 1910.1200(f) Labels and Other Forms of Warning



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- Hazard Statements
  - A phrase assigned to a hazard class that describes the nature of the hazard, and its level of severity
    - "Highly Flammable"
    - "Unstable Explosive"
    - "Toxic if Inhaled"
- Three types
  - Physical
  - Health
  - Environmental

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## 1910.1200(f) Labels and Other Forms of Warning



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✓ Pictograms

- ✓ Display health, physical and environmental hazard information.



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## 1910.1200(f) Labels and Other Forms of Warning



- ✓ Pictograms feature a **white background** with a **red border** instead of a solid orange background.
- ✓ Harmful chemicals are marked with an exclamation mark.



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## GHS Pictograms



<b>Exploding bomb</b>  Explosives; Self Reactive; Organic Peroxides	<b>Skull and Crossbones</b>  Acute toxicity (severe)	<b>Flame</b>  Flammables; Pyrophorics; Self-Heating; Solids Flammable Gas; Self Reactive; Organic Peroxides
<b>Gas Cylinder</b>  Gases under pressure	<b>Health Hazard</b>  Carcinogen; Mutagenicity; Reproductive Toxicity; Respiratory Sensitizer; Target Organ Toxicity; Aspiration Toxicity	<b>Flame over circle</b>  Oxidizers
<b>Corrosion</b>  Corrosives	<b>Exclamation mark</b>  Irritant; Skin Sensitizer; Acute Toxicity (harmful); Narcotic effects; Respiratory Tract Irritant; Hazardous to Ozone Layer	<b>Environmental</b>  Aquatic Toxicity (OSHA did not propose this pictogram)

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## 1910.1200(f) Labels and Other Forms of Warning



- Precautionary Information
  - Phrases indicate measures recommended to help minimize or prevent the effects resulting from exposure, improper storage or handling of hazardous products
  - Precautionary statements include provisions for storage, handling, response and disposal
  - Proposed Appendix C contains, among other information, statements recommended for each level of hazard within each hazard class.

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### 1910.1200(f) Labels and Other Forms of Warning



- Supplier Identifier
  - Name, address and telephone number of the manufacturer or supplier of the hazardous chemical.



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### 1910.1200(f) Labels and Other Forms of Warning



- Manufacturer Information
  - Manufacturers must add new information to a safety data sheet within 6 months after becoming aware of any new significant information regarding the hazards of a chemical or ways to protect against the hazards.

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### 1910.1200(g) Safety Data Sheets



- Information source about hazards of a chemical substance or mixture and to obtain guidance on safety precautions
- SDS information can be used by those involved in the transport of dangerous goods and emergency responders

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## 1910.1200(g) Safety Data Sheets



- When is an SDS required?
  - An SDS should be produced for all chemicals (substances and mixtures) which meet the harmonized criteria for physical, health or environmental hazards under the GHS and ...
  - For all mixtures which contain substances that meet the criteria for:
    - Carcinogens,
    - Toxic to reproduction or
    - TOST (Target Organ Systemic Toxicity) in concentrations exceeding the cut-off limits specified by the criteria for mixtures.

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## 1910.1200(g) Safety Data Sheets



- Sections
  - 1. Identification
  - 2. Hazard (s) identification
  - 3. Composition/ information on ingredients
  - 4. First-aid measures
  - 5. Fire-fighting measures
  - 6. Accidental release measures
  - 7. Handling and storage
  - 8. Exposure control/ personal protection
  - 9. Physical and chemical properties
  - 10. Stability and reactivity
  - 11. Toxicological information
  - 12. Ecological information
  - 13. Disposal considerations
  - 14. Transport information
  - 15. Regulatory information
  - 16. Other information

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## SDS Management



12:48 PM Sat Jul 6  
msdsonline.com  
1910.1200 - Hazard Communication | Occupational Safety and Health Administration  
Manage Material Safety Data Sheets (MSDS) with MSDSonline  
Unlimited SDS Searches, 5 FREE Downloads, No Credit Card | [INSTANT FREE TRIAL](#)  
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### 1910.1200(h) Employee Information and Training



- Informed of
  - HazCom regulation
  - Location of hazardous chemicals
  - Location of written program
  - Location of hazardous chemicals list
  - Location of SDS's

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### 1910.1200(h) Employee Information and Training



- Trained in
  - Methods to detect the presence of hazardous chemicals in the workplace
  - Physical and health hazards
  - Methods of employee protection
  - HazCom program details
    - Labeling
    - Reading and interpreting SDS's

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### 1910.1200(i) Trade Secrets



- Measures to protect:
  - Chemical identity
  - Chemical composition
- Must be requested in writing

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**FACILITY INSPECTIONS**

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