

# THE GLOBALLY HARMONIZED SYSTEM (GHS) FOR HAZARD CLASSIFICATION AND LABELING

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Presented by:  
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Text found: [www.osha.gov/dsg/hazcom/ghs-final-rule.html](http://www.osha.gov/dsg/hazcom/ghs-final-rule.html)



## Safety Training & Environmental Protection, LLC

# STEP

*STEP up to compliance*



Specializing in keeping companies compliant in the following areas:

Hazmat, OSHA 10 & 30 Hour, Permit-Required Confined Spaces, Industrial Hygiene, Facility Audits, PSM, Forktruck Safety, Electrical Safety with NFPA 70E, Fire Extinguisher Safety, and other regulatory and Environmental training and services

MORE THAN  
25 YEARS  
EXPERIENCE!

Sara Fineman, CHMM at a glance:

- Worked at Federal OSHA, Region IV
- JT Baker Chemical Company
- Senior Consultant
- Hazmat instructor
- Compliance audits

# What To Discuss?

- A little history about GHS
- The new 2012 Hazard Communication
- Written program
- Labels
- Safety data sheets
- Training
- Compliance dates and game plan

# Compliance Dates

## ***Employers must:***

- Dec 1, 2013 Train employees on new labels & SDS
- June 1, 2016 Update labels, complete training & update hazcom program

## ***Chemical manufacturers, distributors, importers***

- June 1, 2015 Comply with provisions of rule—  
except can continue to...
- December 1, 2015 ship under old system until this date

***Other countries have been and still are phasing in GHS***

# What is the GHS?

- A common and coherent approach
- Defines and classifies hazards
- Communicates information on labels and safety data sheets

*Provides infrastructure for establishment of national and international comprehensive chemical safety programs*

# Why is the GHS needed?

- Variation from country to country and state to state
- United States -estimated 650,000 such products
- Adoption of requirements
  - Better employee protection
  - Better trade for companies

# Comprehensibility

## Guiding principles:

- Information should be conveyed in more than one way
- Comprehensibility looks at all existing evidence
- Phrases used to indicate the severity of hazard should be consistent across different hazard types

# Major Existing Systems

- UN Transport Recommendations
- European Union Directives
- Canadian Requirements for Workplace, Consumers and Pesticides
- US Requirements for Workplace, Consumers and Pesticides



# International Mandate

- Brazil 1992
  - International mandate to harmonize
  - Adopted at UN Conference on the Environment and Development

*“A globally-harmonized hazard classification and compatible labeling system, including material safety data sheets and easily understandable symbols, should be available, if feasible, by the year 2000.”*

# Principles Of Harmonization

- Protection is not reduced
- Comprehensive system
- All types of chemicals will be covered
  - based on intrinsic properties (hazards) of chemicals



# The Scope of the GHS

- Covers all hazardous chemical substances, dilute solutions, and mixtures
- Pharmaceuticals, food additives, cosmetics and pesticide residues in food
  - not be covered at the point of intake
  - will be covered where workers may be exposed and in transport

# The GHS Elements

## Classification Criteria

- Health and Environmental Hazards
- Physical Hazards
- Mixtures

## Hazard Communication

- Labels
- Safety Data Sheets

# What's The Difference?

- Written program – mostly unchanged
- Training – new labels/sds
  - keep same training & add info as it comes into workplace
- Labels - new standards
- (M)SDS – extensive changes

# Written program

- Definitions have changed or been revised
- Some sections called differently
  - Hazard determination *now*
  - Hazard classification
- Mandatory appendices – give guidance

# Revised Definitions

- Chemical
- Chemical name
- Hazardous chemical
- Health hazard
- Label
  - Used to say “any written printed material” NOW
  - “an appropriate group of written, graphic...”
- Mixture

# New Definitions

- Hazard class
- Hazard category
- HNOC
- Hazard statement
- Label elements
- Pictogram
- Precautionary statement
- Product identifier
- Pyrophoric gas
- Safety data sheet
- Signal word
- Simple asphyxiant
- Substance



# New Definition - HNOC

- Hazards Not Otherwise Classified
- New name of unclassified hazards
  - Not to be listed on labels
  - Must identify in SDS section 2
  - Not classified by GHS, but OSHA added;
    - Pyrophoric gases
    - Simple asphyxiants
    - Combustible dust – OSHA hasn't defined

# New Definition – Hazard Classification

- Specific criteria for classifying health and physical hazards into:
  - hazard class indicates the nature of hazard (e.g. flammability) *and*
  - hazard category is the degree of severity within each hazard class (e.g. four levels of flammability)

# Hazard Classification – Health & Environmental Hazards

## Acute Toxicity

Skin Corrosion/Irritation

Serious Eye Damage/Eye Irritation

Respiratory or Skin Sensitization

Germ Cell Mutagenicity

Carcinogenicity

Reproductive Toxicity

Target Organ Systemic Toxicity – Single and Repeated Dose

Aspiration

Hazardous to the Aquatic Environment

# Appendix A – Class w/category

## ACUTE ORAL TOXICITY - Class

|                  | 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 |

# Physical Hazards

- Definition, test methods and classification
- **Used criteria for transport** as basis for the work since they were already harmonized

# Physical Hazards

Explosives class with categories 1.1-1.6

Flammability – gases, aerosols, liquids, solids

Oxidizers – liquid, solid, gases

Self-Reactive

Pyrophoric – liquids, solids

Self-Heating

Organic Peroxides

Corrosive to Metals

Gases Under Pressure

Water-Activated Flammable Gases

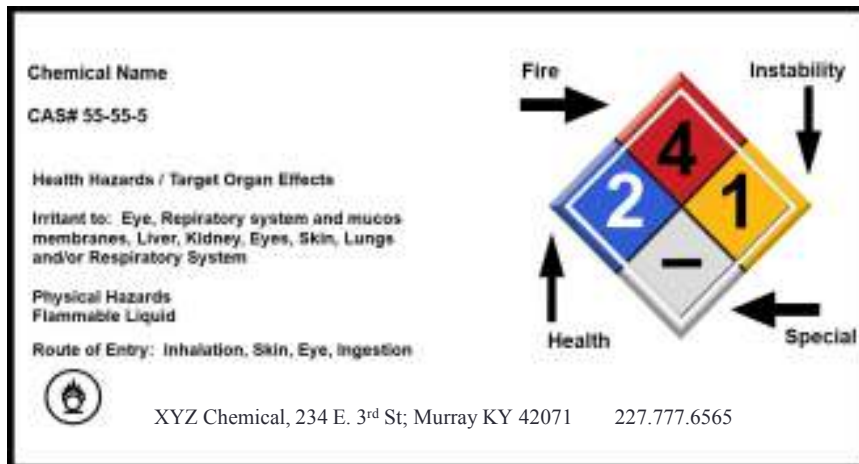


# Labels

- Standardization for all labels
- Reprocess of all labels in transit
- Enhance communication, changes to be made:
  - Standard pictograms
  - Signal words (Danger or Warning)
  - Hazard statements
  - Precautionary statements

# New Label Requirements

## Workplace Label



Chemical Name  
CAS# 55-55-5

Health Hazards / Target Organ Effects  
Irritant to: Eye, Respiratory system and mucous membranes, Liver, Kidney, Eyes, Skin, Lungs and/or Respiratory System

Physical Hazards  
Flammable Liquid

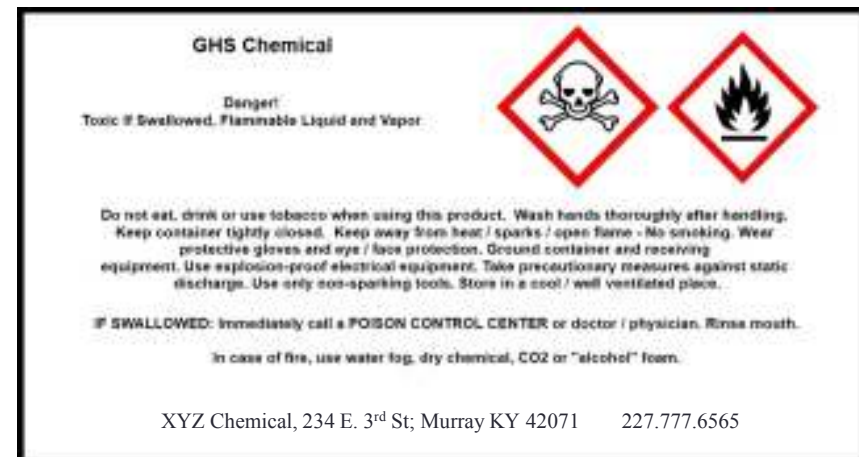
Route of Entry: Inhalation, Skin, Eye, Ingestion

Fire → 4 → Instability  
Health ← 2 ←  
Special ← 1 ←

XYZ Chemical, 234 E. 3<sup>rd</sup> St; Murray KY 42071 227.777.6565

- Current OSHA Standard
  - Material identity
  - Hazard warnings
  - Supplier information

## GHS Label



GHS Chemical

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 a 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, CO2 or "alcohol" foam.

XYZ Chemical, 234 E. 3<sup>rd</sup> St; Murray KY 42071 227.777.6565

- Updated OSHA GHS Standard
  - Product identifier
  - Signal word
  - Hazard statements
  - Precautionary statements
  - Pictograms
  - Supplier information
  - Supplemental information



# GHS Pictograms



Explosives,  
self-reactives,  
organic peroxides



Gases under pressure



Flammables, pyrophoric,  
Self-heating, emits flam gas,  
self-reactive,  
organic peroxides



oxidizers



Acute toxicity,  
fatal or toxic



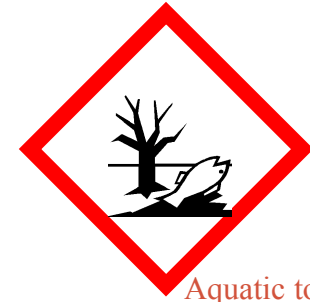
Skin corrosion/burns,  
eye damage  
corrosive to metals



Carcinogen, mutagenicity,  
Repro toxicity, resp sensitizer,  
target organ toxicity,  
aspiration toxicity



Irritant, skin sensitizer,  
acute toxicity, narcotic  
effects, resp tract irritant,  
haz to ozone layer



Aquatic toxicity

# Signal Words

“Danger” or “Warning”

- Used to emphasize hazard and discriminate between levels of hazard

# Hazard Statements

- A specific harmonized hazard statement for each level (degree of hazard) within each hazard class:
  - Example: Flammable liquids
    - Category 1: Extremely flammable liquid and vapor
    - Category 2: Highly flammable liquid and vapor
    - Category 3: Flammable liquid and vapor
    - Category 4: Combustible liquid

# Precautionary Information

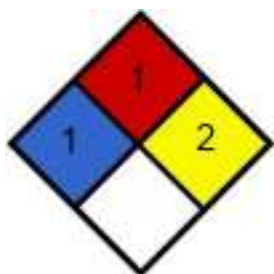
- Include appropriate precautionary information
- Examples of precautionary statements are provided
- Intent is to harmonize

*Prevention    Response    Storage*

# UPDATE TO GHS



## Tetraethyl Resin



4 = severe  
3 = serious  
2 = Moderate  
1 = Slight  
0 = Minimal

|              |    |
|--------------|----|
| Health       | 2* |
| Flammability | 1  |
| Reactivity   | 1  |
| PPE          | B  |

Refer to (M)SDS for more details

## Tetraethyl Resin

**Danger**



Heating may cause a fire.  
Combustible liquid.  
May cause damage to organs through prolonged or repeated exposure.  
Harms public health and the environment by destroying ozone in the upper atmosphere.  
May cause damage to organs through prolonged or repeated exposure by skin contact.  
Contains epoxy constituents. May produce an allergic reaction.

If medical advice is needed, have product container or label at hand.  
Keep out of reach of children.  
Read label before use.  
~~Obtain special instructions before use.~~  
Do not handle until all safety precautions have been read and understood.  
Keep away from heat/sparks/open flames / hot surfaces. No Smoking.

Supplemental Label Information  
For further information on this product, see Safety Data Sheet

Contains  
Isocyanic acid, polymethylenepolyethylene ester >> Benzene, methylenbis

Dow Chemical  
1181 West Oak Parkway, Marietta, Georgia 30062-221, United States  
Phone: 800-366-4740

## Current OSHA Template

- Identify of hazardous chemical
- Hazard warnings
- Contact information for manufacturer/importer/responsible party

## GHS Template

- Product Identifier
- Pictograms
- Signal word
- Precautionary statements
- Hazardous Statements
- Supplemental Information
- Supplier Identification

# GHS Label

Identity

Signal Word

Hazard Statements


Manufacturer or Distributor

Pictograms

Precautionary statements

**FLAMMABLE MATERIAL**  
Hazardous Components: Ethyl Alcohol (64-17-5); Methanol (67-56-1)

**DANGER**



**Highly flammable liquid and vapor. Causes severe skin burns and eye damage. May be harmful if inhaled. May cause respiratory irritation and drowsiness or dizziness. May cause cancer. May damage fertility or the unborn child. Very toxic to aquatic life.**

**Prevention** Avoid breathing dust, fume, gas, mist, vapors and/or spray. Wear protective gloves, clothing, and eye/face protection. Wash thoroughly after handling. Do not handle until all safety precautions have been read and understood. Ground and/or bond container and receiving equipment. Keep away from heat, sparks, open flames and/or hot surfaces - No smoking. Use explosion-proof electrical, ventilating and/or lighting equipment. Use only non-sparking tools. Avoid release to the environment.

**Response** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. In case of fire: Use appropriate media for extinction.

**Storage/Disposal** Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

2 percent of this product consists of an ingredient of unknown toxicity.

Industrial Data Systems 709 Nissan Drive Smyrna, TN 37167  
Emergency: 800-555-5555

# Container Labeling



## Acetone

**Danger! Highly flammable liquid and vapor  
Causes severe eye irritation**



**Keep away from heat, sparks and flame – No smoking. Take precautionary measures against static discharge. Keep from direct sunlight. Keep container closed when not in use. Store in a cool/low temperature, well-ventilated place away from heat and ignition sources. Use only in a well-ventilated area. Avoid contact with eyes, skin and clothing. Wear appropriate personal protective equipment, avoid direct contact. Flush eyes with water for at least 15 minutes while holding eyelids open.**

All-Chem Supply Company  
353 Water Street  
Maplewood, NJ 01234  
Tel: 973-555-4321

# Internal Label Requirements

check out appendix C

- Product identifier
- Signal word
- Hazard statements
- Pictogram(s)
- Precautionary statements

OR

- Product identifier
  - AND
- Words, pictures, symbols or combination

Mandatory App C  
may not allow  
both of these  
pictograms to be used

## Etibor-48 (Borax Pentahydrate)



### Danger

May damage fertility. May damage the unborn child. Causes serious eye irritation.

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wash eyes thoroughly after handling. IF exposed or concerned: Get medical advice/attention.



# Pictogram Shape and Color

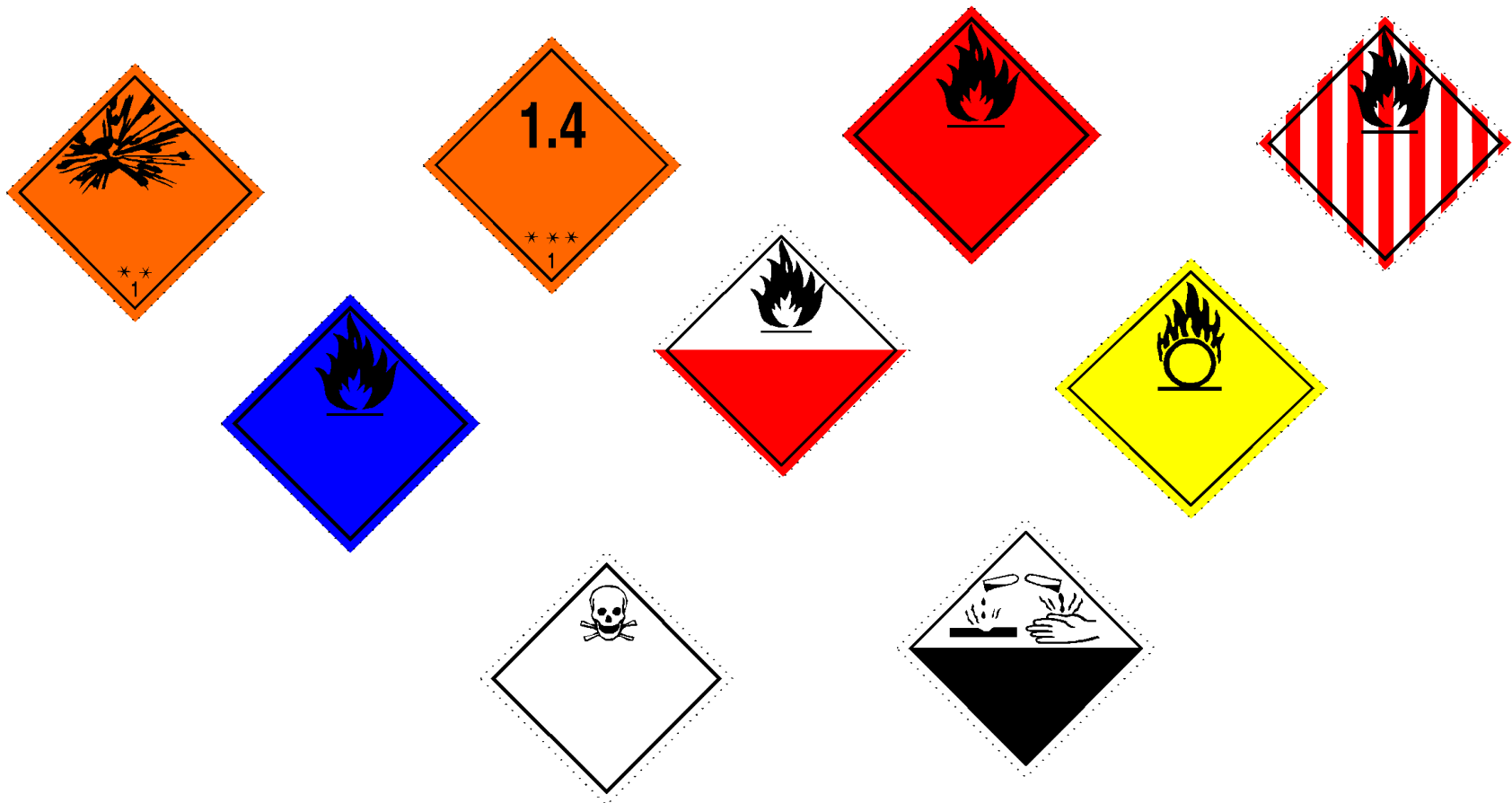


- For transport (DOT), pictograms will have the background and symbol colors currently used
- For other sectors, pictograms will have a black symbol on a white background with a red diamond frame.



- Black frame may be used for shipments within one country
- Where transport pictogram appears - GHS pictogram for same hazard should not appear

# Transport Pictograms



# How Might This Look In Transport?

Resin solution X 50

Company Name

Street

City, State Zip Code

Tel.:/ Fax:/ E-mail:



Danger

If medical advice is needed, have product container or label at hand. Keep out of reach of children. Read label before use.

**Hazard statements:**

May be fatal if swallowed and enters airways. Suspected of damaging fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure. Flammable liquid and vapour. Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. May cause drowsiness or dizziness. Toxic to aquatic life with long lasting effects.

**Precautionary statements:**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed.  
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. IF ON SKIN: Wash with plenty of soap and water. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up. Dispose of contents/container in accordance with local/regional/national/international regulations.

**Product contains:** reaction product: bisphenol-A-(epichlorhydrin) epoxy resin (number average molecular weight = 700), toluene



Gefahr

Ist ärztlicher Rat erforderlich, Verpackung oder Etikett bereithalten. Darf nicht in die Hände von Kindern gelangen. Vor Gebrauch Etikett lesen.

**Gefahrenhinweise:**

Kann bei Verschlucken und Eindringen in die Atemwege tödlich sein. Kann vermutlich die Fruchtbarkeit beeinträchtigen oder das Kind im Mutterleib schädigen. Kann die Organe schädigen bei längerer oder wiederholter Exposition. Flüssigkeit und Dampf entzündbar. Verursacht Hautreizungen. Verursacht schwere Augenreizung. Kann allergische Hautreaktionen verursachen. Kann Schläfrigkeit und Benommenheit verursachen. Giftig für Wasserorganismen, Langzeitwirkung.

**Sicherheitshinweise:**

Vor Gebrauch besondere Anweisungen einholen. Vor Handhabung sämtliche Sicherheitsratschläge lesen und verstehen. Von Hitze/Funken/offener Flamme/heißen Oberflächen fernhalten. Nicht rauchen. Behälter dicht verschlossen halten.  
BEI VERSCHLUCKEN: Sofort GIFTINFORMATIONSZENTRUM oder Arzt anrufen. BEI BERÜHRUNG MIT DER HAUT: Mit reichlich Wasser und Seife waschen. BEI BERÜHRUNG MIT DER HAUT (oder dem Haar): Alle kontaminierten Kleidungsstücke sofort ausziehen. Haut mit Wasser abwaschen/duschen. BEI EINATMEN: An die frische Luft bringen und in einer Position ruhigstellen, die das Atmen erleichtert.  
An einem gut belüfteten Ort lagern. Behälter dicht verschlossen halten. An einem gut belüfteten Ort lagern. Kühl halten. Unter Verschluss lagern.  
Entsorgung des Inhalts / des Behälters gemäß den örtlichen / regionalen / nationalen / internationalen Vorschriften.

**Enthält:** Reaktionsprodukt: Bisphenol-A-Epichlorhydrinharze mit durchschnittlichem Molekulargewicht = 700, Toluol

# Pictograms Not Incorporated Into GHS

Class 6.2



Infectious  
substances

Class 7



Radioactive material

Class 9



Miscellaneous  
dangerous  
substances and  
articles

# Basis of SDS

- Flexibility of format removed
- Classified for health and physical hazards based on GHS criteria
- Consistency of the 16 mandated sections

# Tiered Approach to Classification

Generally use test data for the mixture, when available



Use bridging principles, if applicable



For health and environmental hazards, estimate hazards based on the known ingredient information

# (M)SDS Format

Will have a specified 16 section –format.

## 1. Identification

- Product identifier, emergency number

## 2. Hazard(s) identification

- Class/category
- Signal word
- HNOC
- Mixture comment

# Understand the numbers...

## *NFPA*



- 4 = severe
- 3 = serious
- 2 = Moderate
- 1 = Slight
- 0 = Minimal

## *GHS Nomenclature*

- Cat. 1 severe hazard
- Cat 2 serious hazard
- Cat 3 moderate hazard
- Cat 4 slight hazard
- Cat 5 minimal hazard

| Flammability criteria                  | GHS Category | NFPA Rating | HMIS Rating |
|--|--------------|-------------|-------------|
| Flpt <73F, bpt <100F                   | 1 or 2       | 4           | 4           |
| Flpt <73, bpt ≥100F<br>Flpt >73 & <100 | 2 or 3       | 3           | 3           |
| Flpt ≥ 100F & <200F                    | 3 or 4       | 2           | 2           |
| Flpt >200 ....                         | None         | 1           | 1           |



# (M)SDS Format

## 3. Composition/information on ingredients

- Chem name, common name, CAS, ingredient % or cut off limits

## 4. First-aid measures

- Necessary measures, symptoms/effects

## 5. Fire-fighting measures

- Suitable and “un” & hazards from fire

# (M)SDS Format

## 6. Accidental release measures

- Precautions, PPE, emergency procedures

## 7. Handling and storage

- Precautions, special handling

## 8. Exposure control/personal protection

- PEL, TLV, NTP, IARC, eng controls

# (M)SDS Format

## 9. Physical and chemical properties

- Appearance, odor threshold, pH, flash point, LEL/UEL, vapor pressure/density

## 10. Stability and reactivity

- Possible hazardous reactions, incompatible materials

## 11. Toxicological information

- Routes of exposure, symptoms, acute/chronic

# (M)SDS Format- non-mandatory

12. Ecological information

13. Disposal consideration

14. Transport information

15. Regulatory information

16. Except Other information – is mandatory

- Date of preparation/last revision

# Communication/Training



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***Other countries have been and still are phasing in GHS***

# Summary

- Update SDS
- Update labels
- Begin training on new pictograms/info
- Results
  - Better employee protection
  - Consistent information
  - Clear chemical hazard info



## Other OSHA Standards affected....

- OSHA is modifying provisions in:
  - Flammable/comb liquid, 1910.106
  - Lab standard
  - PSM, 1910.119
  - Substance-specific health standards



# What's My Plan?



- Acquire, update & manage new SDS
  - Database may need to be expanded
- Update posters with new pictograms
- Look at in-house label technology
  - Database need to be expanded/changed
  - New in-house printed
- Develop training for site specific needs

# Questions?



## GHS Pictograms

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| Explosive<br>Self-Reacting<br>Organic<br>Peroxides |  | Flammable<br>Self-Flammable<br>Pyrophoric<br>Self-Heating<br>Oxidizing<br>Flammable Gas |  | Oxidizing<br>Organic<br>Peroxides  |  |
| Corrosive  |  | Acute<br>Toxicity<br>Target Organ<br>Toxicity<br>Multiple<br>Aquatic<br>Hazard          |  | Environmental<br>Toxicity  |  |
| Gases Under<br>Pressure                            |  | Acute<br>Toxicity<br>(fatal)  |  | Inherently<br>Dermal<br>Sensitizer<br>Irritant<br>Toxicity (harmful)<br>Toxicant (target organ<br>effects<br>(specific or<br>respiratory)) |  |

**STEP**  
STEP up to compliance