Hazardous Materials Labeling and Storage Management

Why is it so Confusing?

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Learning Objectives

★ How to select Labels, Placards and Markings
★ The “LAW” vs. “CONSENSUS” Standards
★ Understand Basics of Labeling and Placards
  • Regulations-DOT, EPA, OSHA
  • Consensus Standards-ANSI, HMIS, NFPA
★ Examples of What to Use
When and What Type to Use?

Diesel Fuel
Overlapping Regulations

Federal Agencies

EPA
DOT
OSHA

State and Local Governments

USDA
FDA
DOE
CAA
TSCA
RCRA
NEPA
CERCLA
P2
Antiquities Act

Historic Preservation Act

Executive Orders

P2 TSCA
CERCLA
FIFRA
Endangered Species

International Treaties

CONSENSUS STANDARDS

Corporate Policy-Good Stewards

Marine and Fisheries

Endangered Species

Antiquities Act
LAW Vs Consensus Standards

🌟 Consensus Standards

• NFPA-Fire Department
• HMIS®- American Coatings Association
• ANSI-American National Standards Institute

🌟 Federal Regulations are the Law

• DOT-Hazardous Materials Transportation
• OSHA- Hazardous Chemicals
• EPA-Hazardous Waste Management
NFPA Standard 704

- National Fire Protection Association
  - Developed to Protect Emergency Responders/Fire Department
  - Blue-Health
  - Red-Flammability
  - Yellow-Instability
  - White-Other Hazards: OX, ALK, CRY, COR, other specific hazards, Dangerous When Wet
  - Severity of Hazards Ranking 0-4, 4 Highest Rating
NFPA-Emergency Responders

NFPA Label

Chem. name

Health (blue)
4 – deadly
3 – extreme danger
2 – hazardous
1 – slightly hazardous
0 – normal material

Specific Hazard
OXY - oxidizer
ACID – acid
ALK – Alkali
COR – corrosive
W - use no water
RAD - radiation haz.

Fire Hazard (red)
Flash Point Temp.
4 – below 73F - v.flam.
3 – 73 to 100F – flam.
2 – 101 to 200F - comb.
1 – over 200F –slightly combustible
0 – will not burn

Reactivity (yellow)
4 – may detonate
3 – shock or heat may detonate
2 – violent chem. reaction
1 – unstable if heated
0 – stable
HMIS III System

- National Paint and Coatings Association developed the HMIS
- Hazardous Materials Identification System for workers
  - Hazard Assessment
  - Labeling
  - MSDS
  - Employee Training
- Mostly Matches NFPA
ANSI-Z535 Consensus Standard

- American National Standards Institute
- New Safety Sign Standard Adopted 2013
- Improved optional design elements GHS
- Better communicate workplace hazards
- Danger, Warning, Caution
- Safety Alert Symbol in Header

September 2015
ANSI vs OSHA

New Format
ANSI-Z535.2-2011 Standard

Traditional OSHA Format
DOT 49 CFR Labels and Placards

- Department of Transportation (FMCSA & PHMSA, Pipeline for Hazardous Materials Safety Administration 49 CFR 100-185
- ENGLISH and Visible
- Railcars, Boxes, tankers, drums, totes
- Three Shipping Regulations
  - Aviation
  - Road/Ground Freight
  - Marine Vessels
DOT Placards

- Construction projects may use them for identification of chemicals on work site
- For large tankers or tanks
- Railcars must always be placarded even if empty unless no hazard is present
- Placard 2 vs 4 sides
- NEW GHS labels and placards are slightly different
Hazmat Shipping

- DOT Labels external on packages, totes or tanks and on Tanker Trucks
- English
- Use the DOT Placards for Shipping
- Use Approved Containers ONLY
- Train Workers on Hazardous Materials

UN Code for Fiberboard Box (4G) and Variable inner-container material and configuration (V)

Solids or Inner Packagings
State/country authorizing mark

United Nations Packaging Symbol
Packing Group tested and max. gross mass (kg)
Last two digits of the year of manufacture
Manufacturer certifying package

 يون

4GV/X13/S/08/USA/+AQ2121
DOT Hazmat Labels & Placards

- Updated 2015 & GHS Compliant
- Nine Hazard Classes
- Additional labels based on new items
- Labels and Placards may vary
- 4 Digit UN/NA Number
  - Specific to a chemical or variety
  - ERG 2012 (2015 due out)
OSHA-GHS Hazcom Standard

- Protection of Worker’s Health and Safety
- Right to Understand Law
- International standard established for hazard identification and classification
- Nine Pictograms for Hazards
# GHS HAZCOM Requirements

<table>
<thead>
<tr>
<th>Effective Completion Date</th>
<th>Requirements</th>
<th>WHO?</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 1, 2013 PAST DUE</td>
<td>TRAIN all employees on the new Label Elements and safety data sheets (SDS) formats and hazards.</td>
<td>Employers</td>
</tr>
<tr>
<td>June 1, 2015**</td>
<td>Manufacturer to be in compliance with new GHS labels and SDSs. <em>Distributors that re-label with own name must comply with all GHS now.</em></td>
<td>Chemical manufacturers and importers, Distributors</td>
</tr>
<tr>
<td>December 1, 2015</td>
<td>Request Current GHS Labels + SDS!!!</td>
<td>Chemical manufactures, distributors and employers!</td>
</tr>
<tr>
<td>June 1, 2016</td>
<td>Employers must update alternative workplace labeling and hazard communication program as necessary, and provide additional employee training for newly identified physical or health hazards.</td>
<td>Employers</td>
</tr>
</tbody>
</table>
GHS by Hazards

GHS – Hazard Pictograms and correlated exemplary Hazard Classes

Physical Hazards
- Explosives
- Flammable Liquids
- Oxidizing Liquids
- Compressed Gases
- Corrosive to Metals

Health Hazards
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR\textsuperscript{a}, STOT\textsuperscript{b}, Aspiration Hazard

Env. Hazards
- Hazardous to the Aquatic Environment

1) carcinogenic, germ cell mutagenic, toxic to reproduction  /  2) specific target organ toxicity
NFPA and GHS Comparison

Comparison of NFPA 704 and HazCom 2012 Labels

<table>
<thead>
<tr>
<th></th>
<th>NFPA 704</th>
<th>HazCom 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Provides basic information for emergency personnel responding to a fire or spill and those planning for emergency response.</td>
<td>Informs workers about the hazards of chemicals in workplace under normal conditions of use and foreseeable emergencies.</td>
</tr>
<tr>
<td><strong>Number System:</strong></td>
<td><strong>NFPA Rating and OSHA’s Classification System</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-4</td>
<td>1-4</td>
</tr>
<tr>
<td></td>
<td>0-least hazardous</td>
<td>1-most severe hazard</td>
</tr>
<tr>
<td></td>
<td>4-most hazardous</td>
<td>4-most severe hazard</td>
</tr>
<tr>
<td></td>
<td>• Health Blue</td>
<td>• The Hazard category numbers are NOT required to be on labels but are required on SDSs in Section 2.</td>
</tr>
<tr>
<td></td>
<td>• Flammability-Red</td>
<td>• Numbers are used to CLASSIFY hazards to determine what label information is required.</td>
</tr>
<tr>
<td></td>
<td>• Instability-Yellow</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Special Hazards-White</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*OK Outdoors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W Water Reactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA Simple Appliances</td>
<td></td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Provided on Label</strong></td>
<td>• Product Identifier</td>
<td>• Signal Word</td>
</tr>
<tr>
<td></td>
<td>• Signal Word</td>
<td>• Hazard Statement(s)</td>
</tr>
<tr>
<td></td>
<td>• Product Identifier</td>
<td>• Pictogram(s)</td>
</tr>
<tr>
<td></td>
<td>• Health Blue</td>
<td>• Precautionary statement(s): and</td>
</tr>
<tr>
<td></td>
<td>• Flammability-Red</td>
<td>• Name address and phone number of responsible party.</td>
</tr>
<tr>
<td></td>
<td>• Instability-Yellow</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Special Hazards-White</td>
<td></td>
</tr>
<tr>
<td><strong>Health Hazards on</strong></td>
<td>Acute (short term) health hazards ORC.</td>
<td>Acute (short term) and chronic (long term) health hazards. Both acute and chronic health effects are relevant for employees working with chemicals day after day. Health hazards include acute hazards such as eye irritants, skin sensitizers and skin corrosives as well as chronic hazards such as carcinogens.</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td>Acute hazards are more typical for emergency response applications.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chronic health effects are not covered by NFPA 704.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>**Flammability/</td>
<td>N/A</td>
<td>A broad range of physical hazard classes are listed on the label including explosives, flammables, oxidizers, reactive, pyrophoric, combustible dusts and corrosives.</td>
</tr>
<tr>
<td>Physical Hazards on**</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NFPA divides flammability and instability hazards into two separate numbers on the label.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flammability in red section Instability in yellow section</td>
<td></td>
</tr>
<tr>
<td>information to place</td>
<td>1) Classify using Appendix A (Health Hazards) and Appendix B (Physical Hazards)</td>
<td></td>
</tr>
<tr>
<td>on label**</td>
<td>2) Label using Appendix C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The hazard category numbers found in section 2 of the HC2012 compliant SDSs are NOT to be used to fill in the NFPA 704 diamond.</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Supplemental information may also appear on the label such as any hazards not otherwise classified, and directions for use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.osha.gov/Log/HazCom/index.html">www.osha.gov/Log/HazCom/index.html</a></td>
<td></td>
</tr>
<tr>
<td>For more information:</td>
<td>National Fire Protection Association <a href="http://www.nfpa.org">www.nfpa.org</a> 1 800-344.3955</td>
<td></td>
</tr>
</tbody>
</table>
OSHA Quick Cards

Hazard Communication Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazards of hazardous chemical products. As of June 1, 2015, the HCS will require new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the headings below:

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.
Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.
Section 3, Composition/Information on ingredients includes information on chemical ingredients; trade secret claims.
Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.
Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.
Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.
Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.
(Continued on other side)

Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); ACGIH Threshold Limit Values (TLVs); and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the SDS where available as well as appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information*
Section 13, Disposal considerations*
Section 14, Transport information*
Section 15, Regulatory information*
Section 16, Other information, includes the date of preparation or last revision.

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15 (29 CFR 1910.1200(g)(22)).

Employers must ensure that SDSs are readily accessible to employees.

For more information:

For more information:
GHS Labeling Simplified

- Pictograms take the guess work out
- Labels include hazards and what to do
You might see the intermediate labeling
This label is missing the precautionary statement

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HAZCOM NEW GHS LABELS

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DEGREASEALINE

DANGER

HAZARD STATEMENTS:
Highly flammable liquid and vapor. May be harmful if swallowed and enters airways.

PRECAUTIONARY STATEMENTS:

EMERGENCY: 1-800-234-5678
ABC Fine Chemicals, 1234 Over There St., Any Town
Tel. (123) 456-7890

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GlobaLabel GL1250

DANGER! ATTENTION! PERIGO! GEVAAR! PERICOLO!

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Keep out of reach of children. Read label before use.
Tenir hors de portée des enfants. Lire l'étiquette avant utilisation.
Manter fora do alcance das crianças. Leia a etiqueta antes da utilização.
Buiten bereik van kinderen. Lees het etiket voor gebruik.
Tenere fuori dalla portata dei bambini. Leggere l'etichetta prima dell'uso.

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CONTACT US FOR MORE INFORMATION
800-656-9476
www.reliancelabel.com

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September 2015
HYDROGEN SULFIDE

UN1053
CAS #: 7783-06-4

DANGER
Extremely flammable gas
Contains gas under pressure.
May explode if heated.
Contains poisonous hydrogen sulfide gas.
Fatal if inhaled.
May cause respiratory irritation.
Very toxic to aquatic life.
Causes eye irritation.

PRECAUTIONS
• Keep away from heat, sparks, open flames or hot surfaces. - No smoking.
• Do not breathe gas, vapours.
• Avoid release to the environment.
• Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
• Eliminate all ignition sources if safe to do so.
• Store in a well-ventilated place.
• Store locked up.

FIRST AID
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 INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. Specific treatment is urgent: maintain adequate ventilation and consider administration of 100% oxygen. Sodium nitrite may be a useful antidote.

Safety Sam’s Hazardous Chemical Liquidators
123 Toxic Lane • Tempe, AZ, 85281 • (602) 639-4802
GHS Labels

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
What is Required by Law?

- OSHA GHS Label for Workers
- Shipping Hazmat – DOT labels/placards
- EPA Hazardous Waste Label

Fire Department (AHJ) NFPA
Number Ranking Confusion?

✈ Different Labeling Systems
  • NFPA/HMIS vs OSHA (LAW)
✈ When do we use each one?
✈ Numerical Ratings Defined Differently
  • NFPA vs HMIS Flammability
  • GHS ratings Backwards

<table>
<thead>
<tr>
<th>HMIS/NFPA 704 Rating System</th>
<th>GHS Hazard Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Minimal</td>
<td>5 Minimal</td>
</tr>
<tr>
<td>1 Slight</td>
<td>4 Slight</td>
</tr>
<tr>
<td>2 Moderate</td>
<td>3 Moderate</td>
</tr>
<tr>
<td>3 Serious</td>
<td>2 Serious</td>
</tr>
<tr>
<td>4 Severe</td>
<td>1 Severe</td>
</tr>
</tbody>
</table>
Employers

Conduct a Site Assessment for Compliance

Train all Employees

Update Alternative Workplace Labeling by June 1, 2016

Require all Vendors to provide new SDS and GHS compliant labels

Obtain copies:
- OSHA 3695
- OSHA CPL 2015 -02-02-079

September 2015
Hazardous Chemical Management

1. Use an OSHA and/or hazards label
2. Labels in English
3. Segregate containers according to hazard
4. Keep a current SDS onsite or accessible
5. Store chemicals inside that are temperature or sunlight sensitive
6. Keep containers in good condition
7. Use secondary containment >110%
EPA-Hazardous Waste Labels

- Hazardous Waste Management
  - Protective of Environment
  - Encourages Reuse/Recycle
- EPA-RCRA 40 CFR 260-282
  - Universal Wastes
  - Hazardous Wastes
    - LISTED (F, K, P, U)
    - Characteristic (Ignitable, corrosive, reactive, toxic)
  - Non-Hazardous Wastes

Do not use **WASTE** if not HAZARDOUS
Hazardous Waste Drums

- Hazardous Waste Label
- DOT Shipping Label
Flammable Lockers

- No combustibles (no paper/cardboard)
- Closed containers
- Maximum quantities
- Self Closing Doors
- Ventilation
- Secondary Containment
- Compatible Chemicals
- LIDS Closed and Secured!
Neat but not compliant.
Secondary Containment

Volume: 110% + Rainfall

Good condition

Compatible Containers
Metal Safety Can-OSHA/NFPA

* Metal containers for flammables
  - Maximum Quantity 5 gallons
  - Yellow-Diesel
  - Red-Gasoline Fuels
  - Spring-closing lid vs. Flash arrestor
  - Spout Cover
  - Approved Safety Cans or DOT
What Needs to be Changed?

- Remove dried plant needles
- Inspect Integrity
- DOT / NFPA 704 Sign
- GHS Labels / Pictograms
- Spill kit / fire extinguisher
What needs to be changed?
What needs to be changed?

Use highest number one sign
Summary

❖ DOT, OSHA, EPA Standards = LAW
  • DOT is for transportation (labels and placards)
  • OSHA is for worker safety (pictograms, SDS, labels)
  • EPA is for hazardous waste management

❖ Consensus Standards = BEST MGT
  • NFPA is for emergency responders (NFPA label)
  • HMIS is general hazmat rating system
  • ANSI (awareness of hazards signage)

❖ Train Workers on ALL Label Systems!
Further Information

www.herservices.com

• Go to Tri-State Link Page (Online until Oct. 2015)
• Copy of Presentation and List of resources
  ✓ OSHA Fact Sheets and Compliance Directives
  ✓ DOT placard handout
  ✓ EPA and other fact sheets for chemicals
  ✓ OSHA GHS website links

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702-897-4906  702-897-8210 FAX
dhale@herservices.com
Alternative methods - KEMKEY

* Color coded and Physical shape fittings

Through the use of different shapes, colors, and markings, KemKey™ couplings, when used with an acceptable safety processes, will make the chance of chemical cross-contamination during transfers virtually impossible.

**SCOPE**
- KemKey™ couplings are shaped so that each class of hazardous chemicals has its own shape.
- Acids – hexagon, Bases – square,
- Reducing agents – heptagon (7 sides)
- Oxidizers – variations on the pentagon;
- Poisons (biocides, herbicides, pesticides, etc.)
- Nonhaazardous - oval
- KemKey™ couplings have specific colors so that every class of hazardous chemicals will have its own color.
- Acids – orange; Bases - blue; Oxidizers – yellow;
- Poisons – purple; Reducers - green; Non-hazardous - teal
- KemKey™ coupling have markings on both the male and female ends that say exactly what the particular fitting is designed to transfer.
- KemKey™ will work with each customer to verify that an acceptable safety process is in place to make sure the entire process is as safe as possible.
- KemKey™ couplings have the correct seals for the class of chemical installed when they ship to make sure there are no questions about the seal compatibility.
- KemKey™ seals are the most technologically advanced seals available on the market.

**USES:**
- Virtually all water-soluble chemicals as well as some specialty chemicals.
- All chemicals that pass through a polypropylene KemKey™ fitting should be compatible with polypropylene. It is the users responsibility to verify that the fitting is acceptable for the chemical being transferred.

**MATERIAL/SIZES**
- KemKey™ fittings are made of polypropylene that is reinforced with 30% fiberglass. When customers are verifying chemical compatibility always refer to polypropylene compatibility tables. Current available sizes are 1” and 2” NPT female thread fittings.

**PRESSURES:**
- KemKey™ fittings are designed to meet or exceed all specifications of standard cam-lock fittings.
- Therefore, it is recommended that you never exceed 125 psi on the fittings.
- Maximum pressure — 125 psi at 70 degrees Fahrenheit.
- Temperature range — 0 to 180 degrees Fahrenheit.

**QUALITY:**
- KemKey™ fittings have been tested by an independent testing company to compare the new design with standard cam-lock fittings.
- KemKey™ fittings met or exceeded the performance of the standard cam-lock fitting in all tests. KemKey™ fittings held approximately twice the water pressure of the standard cam-lock fitting before leakage.
- KemKey™ fittings withheld an average of 8 times the vertical torque before the seal broke and the fitting began to leak.
- The KemKey™ fittings broke (were destroyed) at an average of 3 times the vertical torque of the standard cam-lock fitting.

**WARRANTY:**
- KemKey™ fittings are guaranteed for 5 years from date of purchase. If the fittings fail due to any manufacturing flaw contact KemKey™ and it will be replaced at no cost.
- KemKey™ cam arms are guaranteed not to break. If a cam arm breaks during normal use, contact KemKey™ and a new cam will be shipped to you free of charge.
Example of Propane Labels