### Safe and Compliant Storage and Handling of Chemicals

IEA

League of Minnesota Cities

Safety and Loss Control Workshop

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Institute for Environmental Assessment

- Environmental, Health, and Safety (EHS) consulting firm
- Providing services to a variety of public and private organizations
- Healthcare, education, industrial/manufacturing, cities/counties, etc.
- Based in Brooklyn Park with five satellite offices throughout the State
- Providing trusted health and safety solutions specific to client needs

Risks and methods of chemical exposure

Compliance with State and Federal regulations

Safe handling practices

Agenda

Proper storage and labeling methods

Safety equipment and emergency response

Action items to implement today



### **Chemical Hazards**





### Methods of Exposure





#### Globally Harmonized System

- Globally Harmonized System of Classification and Labeling of Chemicals (GHS) GHS | Adopted by OSHA in 2013
- An international, agreed-upon system for classifying and labeling chemicals
- Goal of standardizing how chemical hazards are communicated across different countries
- Provides consistent labeling and safety data sheet (SDS) organization and standardized phrases and pictograms.





### Employee Right -to-Know (ERK)

- Minnesota Rules 5206.0100 5206.1300: Includes hazardous substances, harmful physical agents (Noise, ionizing radiation & non-ionizing radiation), and infectious agents
- Elements of the standard include:
  - Labeling
  - Safe handling practices
  - Written program
  - Training
  - Safety data sheets (SDSs)



Safety Data Sheets

- 1. Product identification
- 2. Hazard identification
- 3. Composition information
- 4. First aid measures
- 5. Firefighting measures
- 6. Accidental release measures
- 7. Handling and storage
- 8. Exposure control/PPE
- 9. Physical and chemical properties
- 10. Stability and reactivity
- 11. Toxicological information
- 12. Ecological information
- 13. Disposal considerations
- 14. Transportation information
- 15. Regulatory information
- 16. Other
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- The SDS lists important information about a product
- SDSs were previously referred to as Material Safety Data Sheets (MSDSs)
- Now in a 16-section standard format
- It can and should be used in an emergency or for research.





1. Identification									
Product identifier	SUPROX-D								
Other means of identification									
SDS number	554N-27C								
Product code	HIL00161								
Product registration number	1839-224-1658								
Recommended use	Disinfectant/Cleaner								
Recommended restrictions	For Labeled Use Only								
Manufacturer/Importer/Supplier/Distributor information									
Manufacturer									
Company name	HILLYARD INDUSTRIES								
Address	302 North Fourth St.								
	St. Joseph, MO 64501		Individual protection measures	such as personal protective equipment					
		such as personal protective equipment							
			Eye/face protection	Avoid contact with eyes. Chemical safety goggles when working with concentrate.					
Contact person	Regulatory Affairs		Skin protection						
Telephone number	(816) 233-1321 (Ext. 8285)		Skillprotection						
Fax	(816) 383-8485		Hand protection	Wear appropriate chemical resistant gloves.					
E-mail	(800) 424 9200		Other	None normally required. If unable to avoid prolonged or repeated contact with skin, wear					
Emergency telephone #	(Only in the event of chemical emergency involving a spill, leak, fire, exposure or accident		outer	impervious clothing.					
	involving chemicals)		Respiratory protection	Not normally required with adequate ventilation. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level					
2. Hazard(s) identification				(in countries where exposure limits have not been established), an approved respirator must be					
Physical hazards	Flammable liquids	Category 4		wom.					
Health hazards	Skin corrosion/irritation	Category 1	Thermal hazards	None known.					
	Serious eye damage/eye irritation	Category 1							
	Specific target organ toxicity, repeated exposure	Category 2	General hygiene	When using do not smoke. Always observe good personal hygiene measures, such as washing					
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2	considerations	clothing and protective equipment to remove contaminants.					
	Hazardous to the aquatic environment, long-term hazard	Category 2							

**OSHA** defined hazards

Label elements



Not classified.

Danger

Signal word

Hazard statement

Combustible liquid. Causes severe skin burns and eye damage. Causes serious eye damage. May cause damage to organs through prolonged or repeated exposure. Toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Precautionary statement Prevention

Keep away from flames and hot surfaces. - No smoking. Do not breathe mist/vapors. Wash thoroughly after handling. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

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SDS US

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#### Personal protective equipment

Eye protection	:	Wear eye protection/face protection.
Hand protection	:	Wear the following personal protective equipment: Standard glove type. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Skin protection	:	Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing
Respiratory protection	:	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

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## **Chemical Handling**



### Proper Handling



#### Transfers

Use approved containers and equipment Avoid splashing or spilling If necessary, use spill-proof funnels or dispensing systems



### **Mixing Chemicals**

Never mix chemicals unless you are certain it is safe to do so!

Refer to Safety Data Sheet (SDS) for compatibility information

Some chemicals may react violently when combined, releasing dangerous gases or heat



### Personal Protective Equipment (PPE)

- Protects against physical, chemical, biological, and environmental hazards, and significantly reduces the likelihood of injuries, illnesses, and accidents, especially in highrisk environments
- Ensure a job hazard analysis has been completed to determine proper PPE
- Ensure proper PPE is available, used, and that employees have training on its use





### Types of PPE



#### Gloves

Reduce skin absorption

Various types depending on the chemical that's being handled



### Eye/Face/Head Protection

Reduce chemical splashes, fumes, radiation or impact

Could include safety glasses, face shield, welding hood, hard hat, or goggles

### **Body Protection**

Reduce chemical splashes, cuts, or debris

Various materials depending on the chemical that's being handled

Apron, coveralls, chainsaw chaps, welding jacket, etc.



### Types of PPE

#### Footwear

Reduce crushing of the foot or slips

Could include traction footwear for ice, non-skid shoe coverings for floor waxing operations, safety-toed footwear



### Respiratory

Reduce exposure to respiratory contaminants

Ensure OSHA regulations are followed!



### Hearing

Reduce exposure to noise

Could include earmuffs, ear caps or ear plugs

Ensure OSHA regulations are followed!







### Case Study

- Buildings pool operated through an automated system
- Pool operator needed to ensure chemical was maintained in two drums and that a hose from the system was stuck down into the drums
- Chemicals were liquid chlorine and hydrochloric acid
- One of the drums was running low
- The pool operator brought over a new one, opened, and dumped the small remaining amount from the old drum into the new
- They accidentally mixed the chemicals up, not dumping like chemicals together
- They experienced respiratory irritation and now wears a respirator when handling any pool chemicals

# Chemical Storage & Labeling



#### Labeling Requirements



### Pictograms

Serve as visual warnings to quickly communicate specific hazards associated with a chemical

Flame	Flame Over Circle	Exclamation Mark	Exploding Bomb
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Flammables Self Reactives Pyrophorics Self-heating Emits Flammable Gas Organic Peroxides	Oxidizers	Irritant Dermal Sensitizer Acute Toxicity (harmful) Narcotic Effects Respiratory Tract Irritation	Explosives Self Reactives Organic Peroxides
Corrosion	Gas Cylinder	Health Hazard	Skull and Crossbones
Corrosives	Gases Under Pressure	Carcinogen Respiratory Sensitizer Reproductive Toxicity Target Organ Toxicity	Acute Toxicity (severe)
		Mutagenicity Aspiration Toxicity	



### Secondary Container Exemption

- The chemical will be used only by the person who transfers it from the labeled container; and
- It will be under the control of the same person; and
- The chemical in the container is going to be used during the work-shift.

#### The product must still be identifiable!



### **Compliant**

### **Non- Compliant**















### Case Study

On August 4, 2006, two coworkers were preparing a metal staircase for finishing at a job site. During the process, they used a blue liquid acid that was transported to a Gatorade bottle that still had its original label. The bottle was placed near the employees' lunches. Tragically, one worker accidentally drank the liquid, mistaking it for Gatorade. Despite receiving medical attention, the employee passed away 48 hours later.





### Best Practices

Store chemicals in an upright position

Always ensure lids and caps are securely closed after use

Never use food containers to store chemicals

Avoid storing chemicals on shelves above eye level, and ensure shelves are strong enough to support the weight of the containers

Store chemicals within the recommended temperature range. Avoid exposure to extreme heat or freezing conditions.

Keep storage areas well organized and walking paths free of obstructions to reduce the likelihood of spills



### Flammable Cabinets

- Flammable liquids stored in excess of 25 gallons need to be stored in flammable cabinet
- Each cabinet cannot exceed 60 gallons
- Each work area cannot exceed 3 cabinets
- Cannot store anything on top of the cabinet
- Fuel must be stored in approved DOT safety containers—metal with a snapping lid—not in plastic containers
- Cabinets need to be labeled "Flammable Keep Away from Open Flames"
- Materials that should be stored in a flammable cabinet include (but not limited to) acetone, ethyl ether, gasoline, diesel, spray paint, oil-based paints, mineral oil, and similar substances.





# Does a flammable cabinet need to be vented to the outdoors?

NO! It's designed to keep a fire within.



## Safety Equipment and Response





### Eyewash Station Locations

- Based on risk of corrosive chemical exposure to the face and body
- SDS identifies the need for an eyewash
- Required if the SDS states the product can cause eye burns, corneal damage, blindness, eye damage or is a Category 1 eye hazard





### Eyewash Station Requirements

- Stations located within a 10-second walk (approximately 55 feet) from work area
- Must be inspected and flushed weekly
- Installed per specifications
- Water maintained at a tepid temperature
- Option of using self-contained stations
  - Ensure solution is changed at required interval
  - Ensure station is still inspected weekly



### Spill Response

- Alert and Evacuate
  - Notify personnel and evacuate if necessary
- Contain Spill
  - Use spill kits, barriers, or absorbents
- $\circ$  Clean Up
  - Follow specific protocols and use neutralizing agents if needed
- Dispose Properly
  - Dispose of contaminated materials according to local regulations



### Considerations for Mobile Employees

- Ensure SDSs are available
- Self contained eyewash stations can be moved, but cannot be exposed to freezing conditions
  - There are eyewash stations available that are resistant to freezing conditions
- Ensure all employees regardless of their location have spill kits and the correct PPE
- Consider environmental conditions of chemicals, ensuring they are not exposed to extreme heat or freezing weather
- Consider transportation laws of chemicals (DOT, chemical stability, etc.)



### Action Items

Written Employee Right-to-Know plan

Up-to-date chemical inventory

Corresponding safety data sheets available

Job hazard analyses

Proper PPE available

**Employee training** 

Properly installed, inspected and maintained safety equipment

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# Questions?

#### **Contact IEA**



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