HAZCOM aka GHS
The Practical Applications in the Construction Field.

Does this mean...
Oh Sh!T

OR

No big deal

Bruce A. Donato, CSP, CHMM, CECD
K & A First Aid & Safety, LLC

TRAINING DISCLAIMER

These materials were developed by K & A First Aid, LLC, and are intended to assist employers, workers, and others as they strive to improve workplace health and safety. While we attempt to thoroughly address specific topics, it is not possible to include discussion of everything necessary to ensure a healthy and safe working environment in a presentation of this nature. Thus, this information must be understood as a tool for addressing workplace hazards, rather than an exhaustive statement of an employer’s legal obligations, which are defined by statute, regulations, and standards. Likewise, to the extent that this information references practices or procedures that may enhance health or safety, but which are not required by a statute, regulation, or standard, it cannot, and does not, create additional legal obligations. Finally, over time, regulators may modify rules and interpretations in light of new technology, information, or circumstances; to keep apprised of such developments, or to review information on a wide range of occupational safety and health topics, you can visit regulatory web sites such as the Department of Transportation at www.dot.gov or OSHA’s website at www.osha.gov.
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Agenda

- Review of pre–test
- Brief GHS Overview & Baseline
- Purple Book
  - Hazard Classifications “0 = 5”???
    - Toxicology Degrees
    - “a vs. b vs. c”
- Construction Samples
  - Labels vs. SDS’s
Disclaimer

- This is not intended to be how to train on HAZCOM
- This is not intended to be a complete review of products/chemicals discussed.
- This IS intended to provide some practical guidance on how to teach construction workers the hazards that they face in the field and how to work with and around them safely.

<table>
<thead>
<tr>
<th>Acute Toxicity</th>
<th>Acute Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity (fatal or toxic)</td>
<td>Acute Toxicity</td>
</tr>
<tr>
<td>Aquatic Toxicity</td>
<td>Aquatic Toxicity</td>
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<tr>
<td>Aspiration Toxicity</td>
<td>Aspiration Toxicity</td>
</tr>
<tr>
<td>Carcinogen</td>
<td>Carcinogen</td>
</tr>
<tr>
<td>Corrosive to Metals</td>
<td>Corrosive to Metals</td>
</tr>
<tr>
<td>Emits Flammable Gas</td>
<td>Emits Flammable Gas</td>
</tr>
<tr>
<td>Explosives</td>
<td>Explosives</td>
</tr>
<tr>
<td>Eye Damage</td>
<td>Eye Damage</td>
</tr>
<tr>
<td>Flammables</td>
<td>Flammables</td>
</tr>
<tr>
<td>Gases Under Pressure</td>
<td>Gases Under Pressure</td>
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<tr>
<td>Hazardous to Ozone Layer</td>
<td>Hazardous to Ozone Layer</td>
</tr>
<tr>
<td>Irritant (skin and eye)</td>
<td>Irritant (skin and eye)</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Mutagenicity</td>
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<tr>
<td>Narcotic Effects</td>
<td>Narcotic Effects</td>
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<tr>
<td>Organic Peroxides</td>
<td>Organic Peroxides</td>
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<tr>
<td>Oxidizers</td>
<td>Oxidizers</td>
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<tr>
<td>Pyrophorics</td>
<td>Pyrophorics</td>
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<tr>
<td>Reproductive Toxicity</td>
<td>Reproductive Toxicity</td>
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<tr>
<td>Respiratory Sensitizer</td>
<td>Respiratory Sensitizer</td>
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<tr>
<td>Respiratory Toxicity</td>
<td>Respiratory Toxicity</td>
</tr>
<tr>
<td>Skin Corrosion/Burns</td>
<td>Skin Corrosion/Burns</td>
</tr>
<tr>
<td>Skin Sensitizer</td>
<td>Skin Sensitizer</td>
</tr>
<tr>
<td>Target Organ Toxicity</td>
<td>Target Organ Toxicity</td>
</tr>
</tbody>
</table>
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).

The Purple Book
## Health Hazards

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Hazard Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin Corrosion/Irritation</td>
<td>1A</td>
<td>1B</td>
<td>1C</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serious Eye Damage/Eye Irritation</td>
<td>1</td>
<td>2A</td>
<td>2B</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Respiratory or Skin Sensitization</td>
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<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germ Cell Mutagenicity</td>
<td>1A</td>
<td>1B</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>1A</td>
<td>1B</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>1A</td>
<td>1B</td>
<td>2</td>
<td></td>
<td>Lactation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOT* – Single Exposure</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOT* – Repeated Exposure</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspiration</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple Asphyxiants</td>
<td></td>
<td>Single Category</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*STOT [=] Specific Target Organ Toxicity
Definitions for Categories

- **TLV** – Threshold Limit Value – amount a person can be exposed to for 8–hours without any known adverse affects (same as PEL)

- **LD<sub>50</sub>** – Lethal Dose 50% – Dose (amount) that when taking orally ½ the test animals die.

- **LC<sub>50</sub>** – Lethal Concentration 50% – Dose (amount) that when breathed in ½ the test animals die.

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### Classification criteria for acute toxicity

<table>
<thead>
<tr>
<th>Acute toxicity</th>
<th>Cat. 1</th>
<th>Cat. 2</th>
<th>Cat. 3</th>
<th>Cat. 4</th>
<th>Cat. 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (mg/kg)</td>
<td>5</td>
<td>50</td>
<td>300</td>
<td>2000</td>
<td>Criteria:</td>
</tr>
<tr>
<td>Dermal (mg/kg)</td>
<td>50</td>
<td>200</td>
<td>1000</td>
<td>2000</td>
<td>- Anticipated oral LD&lt;sub&gt;50&lt;/sub&gt; between 2000 and 5000 mg/kg</td>
</tr>
<tr>
<td>Gases (ppm)</td>
<td>100</td>
<td>500</td>
<td>2500</td>
<td>5000</td>
<td>- Indication of significant effect in human</td>
</tr>
<tr>
<td>Vapours (mg/l)</td>
<td>0,5</td>
<td>2,0</td>
<td>10</td>
<td>20</td>
<td>- Any mortality at class 4</td>
</tr>
<tr>
<td>Dust and mists (mg/l)</td>
<td>0,05</td>
<td>0,5</td>
<td>1,0</td>
<td>5</td>
<td>- Significant clinical signs at class 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Indications from other studies</td>
</tr>
</tbody>
</table>
## Health Hazards

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Hazard Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>1</td>
</tr>
<tr>
<td>Skin Corrosion/ Irritation</td>
<td>1A, 1B, 1C</td>
</tr>
<tr>
<td>Serious Eye Damage/ Eye Irritation</td>
<td>1, 2A, 2B</td>
</tr>
<tr>
<td>Respiratory or Skin Sensitization</td>
<td>1</td>
</tr>
<tr>
<td>Germ Cell Mutagenicity</td>
<td>1A, 1B, 2</td>
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<tr>
<td>Carcinogenicity</td>
<td>1A, 1B, 2</td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>1A, 1B, 2</td>
</tr>
<tr>
<td>STOT – Single Exposure</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>STOT – Repeated Exposure</td>
<td>1, 2</td>
</tr>
<tr>
<td>Aspiration</td>
<td>1</td>
</tr>
<tr>
<td>Simple Asphyxiants</td>
<td>Single Category</td>
</tr>
<tr>
<td><strong>Lactation</strong></td>
<td></td>
</tr>
</tbody>
</table>

## Physical hazards

Include any chemical that is a:

- Combustible liquid
- Oxidizer
- Compressed gas
- Unstable (reactive)
- Explosive
- Pyrophoric
- Flammable
- Water reactive
- Organic peroxide
Physical Hazards

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Hazard Category</th>
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<tbody>
<tr>
<td>Explosives</td>
<td>Unstable Explosives</td>
</tr>
<tr>
<td></td>
<td>Div 1.1</td>
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<tr>
<td></td>
<td>Div 1.2</td>
</tr>
<tr>
<td></td>
<td>Div 1.3</td>
</tr>
<tr>
<td></td>
<td>Div 1.4</td>
</tr>
<tr>
<td></td>
<td>Div 1.5</td>
</tr>
<tr>
<td></td>
<td>Div 1.6</td>
</tr>
<tr>
<td>Flammable Gases</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Flammable Aerosols</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Oxidizing Gases</td>
<td>1</td>
</tr>
<tr>
<td>Gases under Pressure</td>
<td>1</td>
</tr>
<tr>
<td>Compressed Gases</td>
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<tr>
<td>Refrigerated Liquefied Gases</td>
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<tr>
<td>Dissolved Gases</td>
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<tr>
<td>Flammable Liquids</td>
<td>1</td>
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<tr>
<td></td>
<td>2</td>
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<tr>
<td></td>
<td>3</td>
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<td></td>
<td>4</td>
</tr>
<tr>
<td>Flammable Solids</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Self-Reactive Chemicals</td>
<td>Type A</td>
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<tr>
<td></td>
<td>Type B</td>
</tr>
<tr>
<td></td>
<td>Type C</td>
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<td>Type D</td>
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<td>Type E</td>
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<td>Type F</td>
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<td>Type G</td>
</tr>
<tr>
<td>Pyrophoric Liquids</td>
<td>1</td>
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<tr>
<td>Pyrophoric Solid</td>
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<tr>
<td>Pyrophoric Gases</td>
<td>Single category</td>
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<tr>
<td>Self-heating Chemicals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
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<tr>
<td>Chemicals, which in contact with water, emit flammable gases</td>
<td>1</td>
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<td></td>
<td>2</td>
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<td></td>
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<td>Oxidizing Solids</td>
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<td></td>
<td>2</td>
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<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Organic Peroxides</td>
<td>Type A</td>
</tr>
<tr>
<td></td>
<td>Type B</td>
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<tr>
<td></td>
<td>Type C</td>
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<td>Type D</td>
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<td>Type E</td>
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<tr>
<td></td>
<td>Type F</td>
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<tr>
<td></td>
<td>Type G</td>
</tr>
<tr>
<td>Corrosive to Metals</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Combustible Dusts</td>
<td>Single category</td>
</tr>
</tbody>
</table>

Other Types of Hazards

- **“Simple Asphyxiant” Hazards** – 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.
- **“Combustible Dust” Hazards** – dusts that may cause a deflagration, other fires, or an explosion. These dusts include, but are not limited to: metal, wood, coal, plastic, adhesives, bio-solids, sugar, flour, paper, etc.
- **“Pyrophoric Gas” Hazards** – a chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or less.
- **Hazards not Otherwise Classified** – an adverse physical or health effect that does not meet the specified criteria for the physical and health hazard classes already defined.
If you see a label, be sure you know if it is a GHS label or an HMIS/NFPA label.

More than “read the new label. Read the SDS too!”

HOW MANY OF YOU FIND IT EASY TO GET EMPLOYEES TO READ THE LABELS?
Labels vs. SDS’s – The Practical Implications

- How do you get employees to read the label?
- Can they read?
- If they can read can they understand the words used?
- If you can get employees to read the label, can you get them to go to the SDS?
- How many of you know what teratogen means? (Might be on a SDS 😊)
- How well do pictograms work?

Labels vs. SDS
DANGER: Harmful if swallowed. Causes skin irritation. Causes serious eye damage. May cause allergic skin reaction. May cause cancer. May cause respiratory irritation. Causes damage to organs through prolonged or repeated exposure. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothing must not be allowed out of the workplace. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Do not breathe dust.

FIRST AID: If exposed or concerned: Get medical advice/attention. If swallowed: Immediately call a poison center/doctor. Rinse mouth. If on skin: Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If skin irritation or rash occurs: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. Store locked up. Store in a well-ventilated place. Keep container tightly closed. Dispose of contents/container in accordance with local/regional/national/international regulations.

CALIFORNIA PROPOSITION 65: This product contains Crystalline Silica, Quartz and may also contain other chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. 18.4% of the mixture consists of ingredient(s) of unknown acute toxicity.

KEEP OUT OF REACH OF CHILDREN.
SAFETY DATA SHEET

Section 1: IDENTIFICATION

1.1 PRODUCT IDENTIFIER
Product Name: Sakrete 5600 Plus High Strength Concrete Mix

1.2 RECOMMENDED USE OF CHEMICAL AND RESTRICTIONS ON USE
Use: Various

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET
Name/Address: Sakrete of North America
1001 Griffin Rd., Ste 100
Charlotte, NC 28217
Telephone Number: 986-735-7363

1.4 EMERGENCY TELEPHONE NUMBER
Emergency Telephone: CHEMTREC 800-424-9300
Number: 1-732-527-3887

Section 2: HAZARDOUS IDENTIFICATION

2.1 CLASSIFICATION OF THE CHEMICAL
Hazard Class
Acute toxicity 4 (Oral)
Skin irritation 2
Serious eye damage 1
Skin sensitization 1
Carcinogenicity 1A
Specific target organ toxicity - Single exposure 3
Specific target organ toxicity - Repeated exposure 1

2.2 PHYSICAL STATEMENTS

Signal Word: Danger


Section 3: COMPOSITION/COMPOSITION ON INGREDIENTS

3.1 INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No</th>
<th>Wt %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica, crystalline, quartz</td>
<td>14899-64-7</td>
<td>56 - 92</td>
</tr>
<tr>
<td>Portland cement</td>
<td>68097-15-1</td>
<td>59 - 76</td>
</tr>
<tr>
<td>Arches cement</td>
<td>68131-74-9</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Fused chloride</td>
<td>1333-87-4</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Calcium carbonate</td>
<td>1319-75-7</td>
<td>1 - 3</td>
</tr>
</tbody>
</table>

The percentage (concentration) of composition has been added as a trade secret in accordance with paragraph (i) of §1910.1200.

Section 4: FIRST AID MEASURES

4.1 DESCRIPTION OF THE FIRST AID MEASURE

Eye: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. Get medical attention immediately.

Skin: In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash skin before removing. Call a physician if irritation develops and persists.

Inhalation: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if you feel unwell.

Ingestion: If swallowed, do not induce vomiting unless directed to do so by professional medical personnel.
SAFETY DATA SHEET
A4W821

Section 1. Identification

Product name: UltraCrete™ Extra Coarse Texture Masonry Topcoat

Product code: A4W821

Other means of identification: Not available.

CAS #: Not applicable.

Product type: Liquid.

Relevant identified uses of the substance or mixture and uses advised against: Not applicable.

Manufacturer: THE SHERWIN WILLIAMS COMPANY
153 Y. Prospect Avenue
Cleveland, OH 44115

National contact: The Sherwin-Williams Company,
415 North Service Road East
Oakville, Ontario L6H 5B2, Canada

Emergency telephone number of the company: (216) 555-9207

Product Information:

Telephone Number: Not available.

Regulatory Information:

Telephone Number: (216) 555-9202

Transportation Emergency Telephone Number: (905) 424-9200

Section 2. Hazards Identification

Classification of the substance or mixture: Category 1: ORCHENOGENOTOXICITY - Category 1A.

SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1.

Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 99%.

GHS label elements: Hazard pictograms:

Signal word: Danger.

Hazard statements: May cause cancer. Causes damage to organs through prolonged or repeated exposure.

Precautionary statements:

General: Read label before use. Keep out of reach of children. If medical advice is needed, have
### Section 4. First aid measures

**Description of necessary first aid measures**

**Eye contact**: Immediately flush eyes with plenty of water,33 especially lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

**Inhalation**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, of if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

**Skin contact**: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before reusing it or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean short thoroughly before reuse.

**Date of submission of revision**: 12/13/2014  
**Date of previous revision**: 10/26/2010  
**Version**: 3  
**JTL**

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### Section 4. First aid measures

**Ingestion**: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed, wash mouth and throat and induce vomiting. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be inclined so that vomit does not enter the lungs. Get medical attention. Swallow granules with plenty of water or milk. Do not give anything by mouth to an unconscious person. Get medical attention. Loosen tight clothing such as a collar, tie, belt or waistband.

**Most important symptoms/effects, acute and delayed**

**Potential acute health effects**

**Eye contact**: No known significant effects or acute hazards.

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**UNLAWFUL TO DISPENSE GAS IN ANY GLASS OR UNAUTHORIZED CONTAINERS**

BY ORDER OF STATE FIRE MARSHAL

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**Self Service**

1. REMOVE NOZZLE FROM PUMP  
2. TURN LEVER "ON"  
3. PUT GASOLINE IN TANK  
4. TURN LEVER "OFF"  
5. RETURN NOZZLE TO PUMP  

**WARNING**

SOLVENTS ARE FLAMMABLE.

DANGEROUS IF INHALATION, INGESTION OR CONTACT WITH SKIN.

KEEP OUT OF REACH OF CHILDREN.

SOLVENTS CAN CAUSE SEVERE BURNS.

IF INContact With SKIN OR EYES, WASH AT ONCE WITH LARGE AMOUNTS OF WATER. IF SWALLOWED, CALL A POISON CENTER FOR ASSISTANCE.

IF INHALED, MOVE TO FRESH AIR AND CALL A POISON CENTER FOR ASSISTANCE.
Gasoline

Gasoline is a clear, flammable liquid with a distinctive odor. It is irritating to skin and eyes and can result in respiratory problems. Exposure to gasoline can cause dizziness, unconsciousness, or possible cancer. Due to its flammable nature, gasoline can form explosive mixtures in air.

**DANGER**

Flammable, EXPLOSIVE, INFLAMMABLE, and IRRITANT

**Prevention**

- Keep away from heat, sparks, and open flames.
- No smoking.
- Keep containers tightly closed.
- In case of spillage, clean up with an approved absorbent.
- Do not breathe vapor. Wash hands and any other contaminated skin thoroughly after handling.
- Wear protective gloves and eye protection. Use only outdoors or in a well-ventilated area.

**Response**

- If swallowed: immediately call a poison control center or doctor. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with plenty of soap and water/brake. Wash contaminated clothing before reuse.
- If inhaled: move to fresh air. If not breathing, give artificial respiration. Get medical attention if you feel unwell.

**Storage**

- Store locked up, in a cool, well-ventilated place.

**Disposal**

- Dispose of contents to an EPA-permitted hazardous waste collector.

---

**Safety Data Sheet**

**Material Name:** Gasoline All Grades

**SDS No.:** 9950

**Section 1 - Product and Company Identification**

**Manufacturer/Information**

 Hess Corporation

 1 Hess Plaza

  Whippany, NJ 07981

  Phone: 732-758-4900 (Emergency: 1-800-424-0060)

  Website: HessCo.com/HazzMat (Hazardous Materials Information System)

**Section 2 - Hazards Identification**

**GHS Classification:**

- Flammable Liquid - Category 2
- Skin Corrosion/ Irritation - Category 2
- Eye Damaging - Category 1A
- Toxic to Reproduction - Category 1A
- Specific Target Organ Toxicity (Single Exposure) - Category 3 (Respiratory, Ingestion, Percutaneous)
- Specific Target Organ Toxicity (Repeated Exposure) - Category 1 (Liver, Kidneys, Bladder, blood, bone marrow, nervous system)
- Asphyxiating - Category 1

- Hazardous to the aquatic Environment - Acute Hazard - Category 3

**GHS Label Elements**

- Symbol(s)

**Signal Word**

DANGER

**Hazard Statements**

- Highly flammable liquid and vapor.
- Causes skin irritation.
- May cause genetic defects.
- May cause cancer.
- May cause damage to the unborn child.
- May cause respiratory irritation.
- May cause dizziness or dizziness.
- Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.

- May be fatal if swallowed and enters always
RIOE do not have oxygenates (Ethanol). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

**Section 4 - First Aid Measures**

**First Aid: Eyes**
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

**First Aid: Skin**
Removes contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

**First Aid: Ingestion**
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

**First Aid: Inhalation**
Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

**Section 5 - Fire Fighting Measures**

*General Fire Hazards*
SAFETY DATA SHEET

1. Identification

Product identifier: SHEETROCK® Brand Gypsum Panels
Other means of identification: T-4191

2. Hazard(s) Identification

Hazard classification: Not classified
Exposure危险物: Not classified

3. Composition or Information on Ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium sulfate dihydrate (alternative CAS 13501-44-4)</td>
<td>12427-24-9</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Calcium</td>
<td>408-30-0</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

Composition comment: All concentrations are in percent by weight unless indicated otherwise.

4. First-aid measures

Inhalation: Remove to fresh air. If symptoms persist, call a physician.

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### 8. Exposure controls/personal protection

#### Occupational exposure limits

**US. OSHA Table Z-4 Limits for Air Contaminants (29 CFR 1910.1000)**

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium sulfate dihydrate (alternative CAS 10161-41-4) (CAS 13397-24-5)</td>
<td>PEL</td>
<td>5 mg/m³</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Cellulose (CAS 9004-34-6)</td>
<td>PEL</td>
<td>5 mg/m³</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mg/m³</td>
<td>Total dust.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mg/m³</td>
<td>Total dust.</td>
</tr>
</tbody>
</table>

#### US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium sulfate dihydrate (alternative CAS 10161-41-4) (CAS 13397-24-5)</td>
<td>TWA</td>
<td>10 mg/m³</td>
<td>Inhalable fraction.</td>
</tr>
<tr>
<td>Cellulose (CAS 9004-34-6)</td>
<td>TWA</td>
<td>10 mg/m³</td>
<td>Inhalable fraction.</td>
</tr>
</tbody>
</table>

#### US. NIOSH: Pocket Guide to Chemical Hazards

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium sulfate dihydrate (alternative CAS 10161-41-4) (CAS 13397-24-5)</td>
<td>TWA</td>
<td>5 mg/m³</td>
<td>Respirable.</td>
</tr>
<tr>
<td>Cellulose (CAS 9004-34-6)</td>
<td>TWA</td>
<td>5 mg/m³</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 mg/m³</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 mg/m³</td>
<td>Total</td>
</tr>
</tbody>
</table>

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### 16. Other information, including date of preparation or last revision

- **Issue date**: 18 November 2013
- **Revision date**: 30 July 2014
- **Version #**: 02

- **SHEETRO®® Board Gypsum Panels**
- **SDS US**
- **915745 Version: 02 Revision date: 30 July 2014 Issue date: 18 November 2013**

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**Further information**

- **NFPA Ratings**:
  - Health: 1
  - Flammability: 0
  - Physical hazard: 0
  - Hazard Scale: 0 = Minimal, 1 = Slight, 2 = Moderate, 3 = Serious, 4 = Severe

**NFPA ratings**

- **List of abbreviations**
  - NFPA: National Fire Protection Association

**References**

2. Tested by U.S. National Institute of Environmental Research (NIER).

**Disclaimer**

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.
Practical Solutions (ass/u/mptions)

- Don’t “assume” anything.
- Labels may not have enough hazard information.
- Most people do not read the hazard labels.
- Most people don’t understand the hazard labels.
- Supervisors often make false statements about product/chemical safety.
- Pictograms are not inherently obvious of their warnings.
- Less people read the SDS than the label.
Practical Solutions

- Learn how to read a SDS properly.
- Put a program together that
  - Provides accurate and relevant hazard data.
  - Supports supervisors in providing information.
  - Protects employees from “over-exposure”.
- Don’t bull sh!t!

Contact information

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337 Little Quarry Road
Gaithersburg, MD 20878–5705
301–208–0000
bdonato@kafirstaid.com
www.kafirstaid.com
Reference Slides
The following slides are additional information to supplement this talk.

Hazard Classes
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).

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.
# Physical Hazards

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Hazard Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPLOSIVES</td>
<td></td>
</tr>
<tr>
<td>FLAMMABLE AEROSOLS</td>
<td></td>
</tr>
<tr>
<td>GASES UNDER PRESSURE</td>
<td></td>
</tr>
<tr>
<td>FLAMMABLE SOLIDS</td>
<td></td>
</tr>
<tr>
<td>PYROPHORIC LIQUIDS</td>
<td></td>
</tr>
<tr>
<td>SELF-HEATING SUBSTANCES</td>
<td></td>
</tr>
<tr>
<td>OXIDIZING LIQUIDS</td>
<td></td>
</tr>
<tr>
<td>ORGANIC PEROXIDES</td>
<td></td>
</tr>
<tr>
<td>EXPLOSIVES</td>
<td>Flammable Gases</td>
</tr>
<tr>
<td>FLAMMABLE AEROSOLS</td>
<td>Oxidizing Gases</td>
</tr>
<tr>
<td>GASES UNDER PRESSURE</td>
<td>Flammable Liquids</td>
</tr>
<tr>
<td>FLAMMABLE SOLIDS</td>
<td>Self-Reactive Substances</td>
</tr>
<tr>
<td>PYROPHORIC LIQUIDS</td>
<td>Pyrophoric Solids</td>
</tr>
<tr>
<td>SELF-HEATING SUBSTANCES</td>
<td>Substances which, in contact with water, emit flammable gases</td>
</tr>
<tr>
<td>OXIDIZING LIQUIDS</td>
<td>Oxidizing Solids</td>
</tr>
<tr>
<td>ORGANIC PEROXIDES</td>
<td>Corrosive to Metals</td>
</tr>
</tbody>
</table>

## Physical Hazards Table

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Hazard Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosives</td>
<td>Unstable Explosives Div 1.1 Div 1.2 Div 1.3 Div 1.4 Div 1.5 Div 1.6</td>
</tr>
<tr>
<td>Flammable Gases</td>
<td></td>
</tr>
<tr>
<td>Flammable Aerosols</td>
<td></td>
</tr>
<tr>
<td>Oxidizing Gases</td>
<td></td>
</tr>
<tr>
<td>Gases under Pressure</td>
<td></td>
</tr>
<tr>
<td>Compressed Gases</td>
<td></td>
</tr>
<tr>
<td>Refrigerated Liquefied Liquefied Gases</td>
<td>Div 1.1 Div 1.2 Div 1.3 Div 1.4 Div 1.5 Div 1.6</td>
</tr>
<tr>
<td>Flammable Liquids</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Flammable Solids</td>
<td>1 2</td>
</tr>
<tr>
<td>Self-Reactive Chemicals</td>
<td>Type A Type B Type C Type D Type E Type F Type G</td>
</tr>
<tr>
<td>Pyrophoric Liquids</td>
<td></td>
</tr>
<tr>
<td>Pyrophoric Solid</td>
<td>1</td>
</tr>
<tr>
<td>Pyrophoric Gases</td>
<td>Single category</td>
</tr>
<tr>
<td>Self-heating Chemicals</td>
<td>1 2</td>
</tr>
<tr>
<td>Chemicals, which in contact with water, emit flammable gases</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Oxidizing Liquids</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Oxidizing Solids</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Organic Peroxides</td>
<td>Type A Type B Type C Type D Type E Type F Type G</td>
</tr>
<tr>
<td>Corrosive to Metals</td>
<td>1</td>
</tr>
<tr>
<td>Combustible Dusts</td>
<td>Single category</td>
</tr>
</tbody>
</table>

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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:

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
<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Hazard Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>1</td>
</tr>
<tr>
<td>Skin Corrosion/ Irritation</td>
<td>1A</td>
</tr>
<tr>
<td>Serious Eye Damage/ Eye Irritation</td>
<td>1</td>
</tr>
<tr>
<td>Respiratory or Skin Sensitization</td>
<td>1</td>
</tr>
<tr>
<td>Germ Cell Mutagenicity</td>
<td>1A</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>1A</td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>1A</td>
</tr>
<tr>
<td>STOT – Single Exposure</td>
<td>1</td>
</tr>
<tr>
<td>Aspiration</td>
<td>1</td>
</tr>
<tr>
<td>Simple Asphyxiants</td>
<td>Single Category</td>
</tr>
</tbody>
</table>

**Hazards not Otherwise Classified**

**Simple Asphyxiants and Pyrophoric Gas**

- “Simple asphyxiants” 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.
Flame over Circle

- Oxidizers

Flame

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides
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)

Definitions of Hazard Classes

- The following slides are more detailed definitions of hazard classes.
Explosives

- A solid or liquid chemical which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings

  - Division 1 – mass explosion hazard
  - Division 2 – projection hazard
  - Division 3 – fire hazard and minor blast or minor projection hazard
  - Division 4 – present no significant hazard
  - Division 5 – very insensitive chemicals which have a mass explosion hazard
  - Division 6 – extremely insensitive chemicals but do not have a mass explosion hazard

Flammable Gases

- A gas having a flammable range with air 68°F and a standard pressure of 14.7 psi

  - Category 1 – gases that meet the definition and are ignitable when in a mixture of 13% or less by volume air; or have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit

  - Category 2 – gases not included in Cat 1 and have a flammable range while mixed with air
Flammable Aerosols

- Any non-refillable receptacle containing a gas compressed, liquefied or dissolved under pressure, and fitted with a release device allowing the contents to be ejected as particles in suspension in a gas, foam, paste, powder, or liquid
- Two categories for flammable aerosols

Oxidizing Gases

- Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does
Gases Under Pressure

- Gases which are contained in a receptacle at a pressure of 29 psi or more, or which are liquefied, or liquefied and refrigerated
  - Compressed gas
  - Liquefied gas
  - Refrigerated liquefied gas
  - Dissolved gas

Flammable Liquids

- A liquid having a flash point of not more than 93°C (199.4°F)
  - Construction is slightly different – any liquid having a vapor pressure not exceeding 40 pounds/sq inch at 100°F (37.8°C) and having a flash point at or below 199.4°F (93°C)

- Four Categories
  - Category 1 – Flash point < 73.4°F and initial boiling point ≤ 95°F
  - Category 2 – Flash point < 73.4°F and initial boiling point > 95°F
  - Category 3 – Flash point ≥ 73.4°F and ≤ 140°F
  - Category 4 – Flash point > 140°F and ≤ 199.4°F
Flammable Solids

- A solid which is a readily combustible solid, or which may cause or contribute to fire through friction
- Testing is based on a burning rate test
  - Category 1 –
    - Chemicals other than metal powders – fire does not stop when the zone is wetted and burning time < 45s or burning rate > 2.2 mm/s
    - Metal powders – burning time ≤ 5 min
  - Category 2 –
    - Chemicals other than metal powders – fire stops for at least 4 min when the zone is wetted and burning time < 45s or burning rate > 2.2 mm/s
    - Metal powders – burning time > 5 min and ≤ 10 min

Self–Reactive Chemicals

- Are thermally unstable liquid or solid chemicals liable to undergo a strongly exothermic decomposition even without participation of oxygen
Pyrophoric Liquids

- Means a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air

Pyrophoric Solids

- Means a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air
Self-Heating Chemicals

- Is a solid or liquid chemical, other than a pyrophoric liquid or solid, which, by reaction with air and without energy supply, is liable to self-heat
  - Category 1 – a positive result is obtained in a test using a 25mm sample cube at 284°F
  - Category 2 – a positive result is obtained in a test using a 100mm sample cube at 284°F

Chemicals Emitting Flammable Gas (when in contact with water)

- Solid or liquid chemicals which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities
  - Category 1 – reacts vigorously with water
  - Category 2 – reacts readily with water
  - Category 3 – reacts slowly with water
Oxidizing Liquids

- A liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material

Oxidizing Solids

- A solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material
Organic Peroxides

- A liquid or solid organic chemical which contains the bivalent \( -0\-0\) structure and as such is considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals.

Corrosive to Metals

- A chemical which by chemical action will materially damage, or even destroy, metals.
  - Corrosion rate on either steel or aluminum surfaces exceeding 6.25mm per year at a test temperature of 131°F when tested on both materials.
Acute Toxicity

- Adverse effects occur following oral or dermal administration of a single dose of a substance, or multiple doses given with 24 hours, or an inhalation exposure of 4 hours
  - Four categories – 1–4
  - One being the most toxic and four being the least toxic

Skin Corrosion/Irritation

- Skin Corrosion is the production of irreversible damage to the skin, visible necrosis through the epidermis and into the dermis
  - pH ≤ 2 or a pH ≥ 11.5
- Skin Irritation is the production of reversible damage of the skin
Serious Eye Damage/Irritation

- Eye damage is the production of tissue damage in the eye, or serious physical decay of vision that is typically not fully reversible.

- Eye irritation is the production of changes in the eye that are typically fully reversible.

Respiratory or Skin Sensitization

- Respiratory sensitization means a chemical that will lead to hypersensitivity of the airways following inhalation of the chemical.

- Skin sensitization means a chemical that will lead to an allergic response following skin contact.
  - Sub-category 1A – high frequency of occurrence in humans
  - Sub-category 1B – low frequency of occurrence in humans
Germ Cell Mutagenicity

- Reserved for chemicals that may cause mutations in the germ cells of humans that can be transmitted to the progeny
  - Category 1 – substances that cause heritable mutations or regarded as if they cause mutations in germ cells
    - There are two sub-categories
  - Category 2 – substances that cause concern for humans with the possibility for heritable mutations

Carcinogenicity

- A substance or mixture of substances which induce cancer or increase its incidence
  - Category 1 – known or presumed to cause cancer in humans
    - Category 1A – human evidence that cancer is an effect
    - Category 2B – presumed to cause cancer, based on animal evidence
  - Category 2 – suspected to cause cancer in humans
Reproductive Toxicity

- Adverse effects on sexual function or fertility in adult males and females, as well as adverse effects on development of offspring
  - Category 1 – known or presumed human reproductive toxin
    - Category 1A – known human reproductive toxin
    - Category 1B – presumed human reproductive toxin
  - Category 2 – suspected human reproductive toxin

Specific Target Organ Toxicity Single Exposure

- Specific, non-lethal target organ toxicity arising from a single exposure to a chemical
  - Category 1 – provided significant toxicity in humans after one exposure
  - Category 2 – provided significant toxicity in animals and is presumed to cause toxicity in humans
  - Category 3 – transient target organ effects
Specific Target Organ Toxicity
Repeated or Prolonged Exposure

- Specific target organ toxicity from repeated exposure to a substance or mixture
  - Category 1 – produced significant toxicity in humans
  - Category 2 – produced significant toxicity in animals and is presumed to have the same potential effects in humans

Aspiration Hazard

- Aspiration – the entry of a liquid or solid chemical directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system
  - severe acute effects such as chemical pneumonia
Simple Asphyxiant Hazard

- A substance or mixture that displaces oxygen in the ambient atmosphere, and can cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
- Label: Warning. May displace oxygen and cause rapid suffocation
- Examples:
  - Nitrogen
  - Argon
  - Helium

Combustible Dust

- The dust of a combustible material that is finely divided, suspended in air in the right concentration, and under certain conditions become exploisible
  - Even if the material is not combustible in larger forms, its dust can be (i.e. aluminum and iron)
- Label: Warning. May form combustible dust concentrations in air
- Examples:
  - Grain
  - Tobacco
  - Paper
  - Coal
  - Metals
Pyrophoric Gas Hazard

- A chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F or below

- Label: Danger. Catches fire spontaneously if exposed to air,

- Examples:
  - Arsine
  - Metal carbonyls
  - Diborane
  - Silane

HNOC

- An adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health effects for which there is a hazard class addressed in the standard, but the effect falls below the cut-off value/concentration limit of the hazard class or is under a GHS category that has not been adopted by OSHA
“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.

- 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
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

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/freeing 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$_{50}$
  - LC$_{50}$
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