

SDS – SECTION 4

Considerations for the Human Element

PROBLEMS
AND
SOLUTIONS



INDUSTRY SHORTCOMINGS

In an industry driven by the necessity to comply with ever-changing regulations, we often lose sight of what the true purpose of the SDS is...

THE HUMAN ELEMENT



FIRST-AID MEASURES

PURPOSE

- To describe necessary first-aid instructions BY
 - RELEVANT routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects AND
 - Any symptoms that are acute or delayed.
- Recommendations for immediate medical care AND
 - Special treatment needed, when necessary.



AUDIENCE

- Untrained responders that will provide initial care to the exposed individual.



PROBLEMS

- TOO MUCH / TOO LITTLE INFORMATION
- CONTRADICTORY INFORMATION
- DISPROPORTIONATE
- PRECEDENCE OF FIRST-AID MEASURES
- NOT PERTINENT FOR THE PRODUCT
- NOT AUTHORIZING FOR THE INTENDED AUDIENCE
- INCOMPLETE INFORMATION

EXAMPLE #1

Methanol SDS

HAZARD CLASSIFICATION:

Flammable Liquids, Category 2
Acute Toxicity Oral, Category 5
Acute Toxicity Dermal, Category 4
Acute Toxicity Inhalation, Category 3
Skin Corrosion, Category 1

HAZARD STATEMENTS:

Flammable liquid and vapor
May be harmful if swallowed
Harmful in contact with skin
Toxic if inhaled
Causes severe skin burns and eye damage

WE ARE GOING TO TRY TO
IGNORE THE WRONG
CLASSIFICATION

IT WOULD PROBABLY NOT BE A GOOD
EXAMPLE OF PROBLEMS TO COME IF
IT STARTED OFF CORRECT HERE

EXAMPLE #1 – Methanol SDS

Section 4: First-Aid Measures

After swallowing: fresh air.

Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage).

Call a doctor immediately (mention methanol poisoning).

Only in exceptional cases, if no medical care is available within one hour, induce vomiting (Only in fully conscious persons).

And make victim drink ethanol again (approx. 0.3% ml of a 40% alcoholic beverage kg/body weight/hour).

TOO MUCH INFORMATION

Example #1 – Methanol SDS

Section 4: First-Aid Measures

Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage).

And make victim drink ethanol again (approx. 0.3% ml of a 40% alcoholic beverage kg/body weight/hour).

This is an antidote and outside of the scope of preliminary first aid administered by an untrained responder.

A physician would make that decision after evaluation of the patient.

MEDICAL TREATMENT:

Antidotes fomepizole or ethanol should be administered intravenously as soon as possible to block the conversion of methanol to formic acid and prevent acidosis.

Fomepizole is preferred as its efficacy and safety have been demonstrated, and its therapeutic dose is more easily maintained.

Not Authoring for The Intended Audience

Example #1 – Methanol SDS

Section 4: First-Aid Measures

Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage).

And make victim drink ethanol again (approx. 0.3% ml of a 40% alcoholic beverage kg/body weight/hour).

The Intended Audience is an UNTRAINED RESPONDER

Probably a Co-Worker / The person closest by

This information is intended for qualified MEDICAL PERSONNEL

TOO LITTLE INFORMATION

Example #1 – Methanol SDS

IS THAT IT?

HAZARD STATEMENTS:

Flammable liquid and vapor
May be harmful if swallowed
Harmful in contact with skin
Toxic if inhaled
Causes severe skin burns and eye damage

SECTION 4:

Most important symptoms and effects, both acute and delayed:
Irritation, Nausea, Headache, Shortness of breath

HOW ABOUT -

Corrosive upon ingestion. Will cause burns of the mouth, throat and stomach with possible esophageal perforation. Symptoms include pain, nausea, vomiting, shock and collapse.

Causes severe skin burns, characterized by pain, redness, blisters and visible tissue necrosis.

Eye contact may result in serious eye damage. Symptoms include pain, redness, tearing, burning sensation, corneal opacification and blindness

Toxic if inhaled. Symptoms include nausea, headache, dizziness, headache, central nervous system depression and loss of consciousness.

EXAMPLE #2

Toluene SDS

HAZARD CLASSIFICATION:

Flammable Liquids - Category 2
Skin Irritation - Category 2
Specific Target Organ Toxicity, Single Exposure – Category 3
Reproductive Toxicity – Category 2
Specific Target Organ Toxicity, Repeated Exposure – Category 2
Aspiration Hazard – Category 2

HAZARD STATEMENTS:

Highly flammable liquid and vapor
Causes skin irritation
Causes drowsiness or dizziness
Suspected of damaging fertility or the unborn child.
Causes damage to organs through repeated or prolonged exposure.
May be fatal if swallowed and enters airways.

DISPROPORTIONATE

Example #2 – Toluene SDS

Section 4: First-Aid Measures

REMEMBER – CLASSIFIED AS SKIN IRRITATION – CATEGORY 2

After skin contact: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

WHY WOULD YOU NEED A HOSPITAL TO TREAT IRRITATION?

CONTRADICTIONARY

After eye contact: Protect unexposed eye. Rinse eyes with water for 15– 20 minutes. Remove contact lenses while rinsing.

IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

NOT EVEN CLASSIFIED AS AN EYE IRRITANT

OFF TO THE HOSPITAL AGAIN!



NOT RELATIVE

FIRST AID RECOMMENDATIONS FOR IMPROBABLE ROUTES OF EXPOSURE



Steel Fasteners

GHS Hazard Classification: None

HNOC: May release hazardous metal oxide dust if subjected to grinding, sanding or mechanical abrasion.

FIRST-AID MEASURES:

If Ingested: Rinse mouth with water. Do NOT induce vomiting. Contact a Poison Center or doctor/physician if symptoms persists.

This product is a solid metal. It can not be ingested.

USE YOUR COMMON SENSE

INCORRECT

Hazard Classification

WARNING.



- H302 Acute Toxicity
- H315 Causes skin irritation.
- H317 May cause an allergic skin reaction.
- H319 Causes serious eye irritation.

First-Aid Measures

Ingestion

Do not give liquids if victim is unconscious or very drowsy. Otherwise, give no more than 2 glasses of water and induce vomiting by giving 2 tablespoons syrup of ipecac (1 tablespoon and 1 glass of water for child). If ipecac is unavailable, give 2 glasses of water and induce vomiting by touching finger to back of throat. Keep head below hips while vomiting. Get medical attention.

Vomiting should NOT be induced following ingestion of a chemical in an occupational setting
Unless advised by a Poison Centre or doctor.



THE RIGHT INFORMATION



First-Aid Measures should be based on the Hazard Classification or Classifications

- They should mirror Response Statements from Section 2 with more detail

Instructions should be easy to understand and completed by the First-Aid Provider

- DON'T FORGET YOUR AUDIENCE

Recommendations Should Be Evidence-Based, Consensus-Based or Well-Established First-Aid Procedures.

Present Recommendations In the Order In Which They Should Be Carried Out, With the Most Urgent Measures Listed First.

PRECEDENCE OF FIRST-AID MEASURES

Protection of the First-Aid Provider

Any Requirements for Special Protective Equipment, Clothing or Procedures to Protect the First-Aid Provider Should Come First.



Example 1:

Victim has spilled a corrosive chemical on skin and clothing.

- The First-Aid Provider should be advised to wear appropriate protective equipment such as gloves, chemical goggles, protective clothing.

Example 2:

Victim has become unresponsive after inhalation of a toxic substance.

- The First-Aid Provider should be advised to wear a self contained breathing apparatus operated in positive pressure mode before attempting to aid the victim.

Example 3:

The victim has been overexposed to a flammable liquid.

- The First-Aid Provider should extinguish any sources of ignition before providing aid.

EVIDENCE BASED FIRST-AID MEASURES FOR INTENDED AUDIENCE

DO:

✓ REMOVE

- Source of Exposure or
- Victim From Source of Exposure

✓ RINSE

- It is imperative that rinsing/washing starts immediately following skin or eye contact with a chemical.
 - Longer rinsing/washing may be warranted for corrosive chemicals: 60 minutes for strong alkalis, and 30 minutes for other corrosives.
 - The commonly accepted standard of 15-20 minutes is recommended for moderate to severe irritants.

✓ CONTINUE RINSING

- It is preferable that complete decontamination of the skin or eyes occur on-site.
(Bronstein, et al., 1994, ATSDR, 2001) before transporting to the hospital or continue during transport.



EVIDENCE BASED FIRST-AID MEASURES FOR INTENDED AUDIENCE

DO NOT:

✓ Recommend Neutralizing Agents

- There is no clear benefit to using neutralizing agents instead of water following skin contact with basic or acidic chemicals. (Yano, et al., 1993, Yano, et al. 1994)

✓ Recommend To Inducing Vomiting

- Refer the first-aid provider to a Poison Center or doctor for advice.
- The recommendation to induce vomiting or perform gastric emptying CANNOT be made without careful consideration of many factors, including:
 - Corrosiveness
 - Time Since Ingestion
 - Amount Ingested
 - Whether Vomiting has Already Occurred
 - Risk of Aspiration(Nelson, et al., 2011)

✓ Recommend oral dilution with water or milk.

- "Do not administer anything by mouth for any poison ingestion unless advised to do so by a poison control center or emergency medical personnel because it may be harmful.
- There is insufficient evidence that dilution of the ingested poison with water or milk is of any benefit as a first-aid measure. (Markenson, et al., 2010b)



THE NEED FOR & URGENCY OF MEDICAL TREATMENT

The recommendations for when to seek medical treatment and urgency of treatment is often not proportionate to the Hazard Classification(s).

EXAMPLE 1:

Industrial Cleaner A

Hazard Classification: Eye Irritation – Category 2A

FIRST AID MEASURES:

In case of eye contact: Flush eyes with plenty of water for 15 minutes. Remove contacts if present and able to do so. Seek immediate medical attention.



INDUSTRY RECOGNITION OF THE NEED FOR IMPROVEMENT OF RESPONSE RECOMMENDATIONS

The Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Thirty-fifth session

Geneva, 4-6 July 2018

Item 4 (b) of the provisional agenda

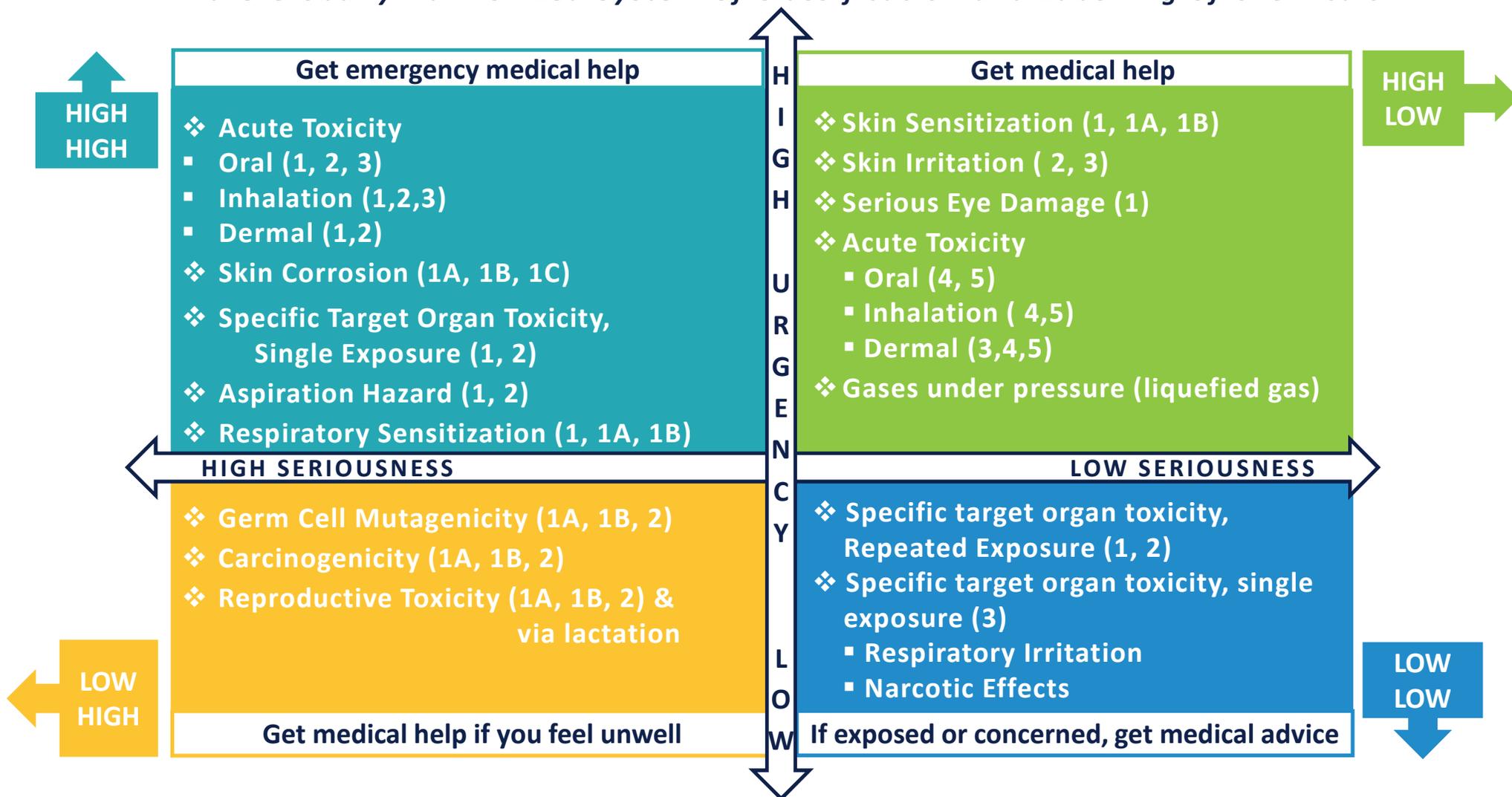
Hazard communication issues:

Improvement of Annexes 1 to 3 and further rationalization of precautionary statements

The Working Committee addresses the need for a methodology when choosing the correct response measures in regard to when and if medical treatment is required.

The initial recommendations include the partitioning of hazards into 4 quadrants of Urgency and Seriousness as a tool for choosing what type of medical treatment is needed.

The Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals



METHYLENE CHLORIDE INTERNATIONAL CHEMICAL SAFETY CARD

CLASSIFICATION & LABELLING

According to UN GHS Criteria



DANGER

FATAL IF INHALED

Harmful if swallowed

Fatal if inhaled

Causes skin and eye irritation

May cause drowsiness or dizziness

Causes damage to central nervous system, blood, liver, the heart and lungs

May be harmful if swallowed and enters airways

Causes damage to the central nervous system through prolonged or repeated exposure if inhaled

May cause cancer

Transportation

UN Classification

UN Hazard Class: 6.1; UN Pack Group: III

https://www.ilo.org/dyn/icsc/showcard.display?p_lang=en&p_card_id=0058&p_version=2

CCOHS

▼ What are the potential health effects of methylene chloride?

TOXIC. CAN CAUSE DEATH

Main Routes of Exposure: Inhalation; skin contact; eye contact.

- **Inhalation:** TOXIC, can cause death. Can irritate the nose and throat. Can harm the nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. Methylene chloride form carbon monoxide in the body. Can harm the blood (decreased ability to carry oxygen).

▼ What are first aid measures for methylene chloride?

PROTECTION OF FIRST AID PROVIDER

Inhalation: Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Move victim to fresh air. Call a Poison Centre or doctor.

Skin Contact: Avoid direct contact. Wear chemical protective clothing if necessary. Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately flush with lukewarm, gently flowing water for 15-20 minutes. Call a Poison Centre or doctor. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal.

Eye Contact: Avoid direct contact. Wear chemical protective gloves if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay flushing or attempt to remove the lens. If irritation or pain persists, see a doctor.

Ingestion: Have victim rinse mouth with water. Immediately call a Poison Centre or doctor.

First Aid Comments: If exposed or concerned, see a doctor for medical advice. All first aid procedures should be periodically reviewed by a doctor familiar with the chemical and its conditions of use in the workplace.

Note to Physicians: This chemical forms carbon monoxide in the body.

https://www.ccohs.ca/oshanswers/chemicals/chem_profiles/methylene.html

INTERNATIONAL CHEMICAL SAFETY CARD

METHYLENE CHLORIDE

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS |
|------------------------------|---|
| FIRE | Combustible under specific conditions. Gives off irritating or toxic fumes (or gases) in a fire. |
| EXPLOSION | Risk of fire and explosion (see Chemical Dangers). |
| EXPOSURE | |
| •INHALATION | Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness. Death.  |
| •SKIN | Dry skin. Redness. Burning sensation. |
| •EYES | Redness. Pain. Severe deep burns. |
| •INGESTION | Abdominal pain. (Further see Inhalation). |

<http://niosh.dnacih.com/nioshdb/ipcsneng/neng0058.htm>

METHYLENE CHLORIDE SDS #1

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2 and/or section 11.)

4.3 Indication of any immediate medical attention and special treatment needed

No data available

HOW ABOUT – INHALATION OF THIS PRODUCT REQUIRES IMMEDIATE MEDICAL TREATMENT

NO PROTECTIVE MEASURES FOR FIRST-AID PROVIDER

REMEMBER – FATAL IF INHALED

ASPIRATION HAZARD – URGENT TREATMENT NEEDED

SECTION 2 DOES NOT PROVIDE SYMPTOMS OF EXPOSURE

METHYLENE CHLORIDE SDS #2

**NO PROTECTIVE MEASURES
FOR FIRST-AID PROVIDER**

| | |
|--|--|
| General Advice | If symptoms persist, call a physician. |
| Eye Contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention. |
| Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician. |
| Inhalation | Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. |
| Ingestion | Clean mouth with water and drink afterwards plenty of water. |
| Most important symptoms and effects | None reasonably foreseeable. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting |
| Notes to Physician | Treat symptomatically |

**NOT THE WHOLE
PICTURE**

THE HUMAN ELEMENT

Case 1: Industrial inhalation, adults (Hayes & Laws, 1991)

Four night-shift workers extracting plant oleoresin using methylene chloride in a room were found unconscious at 7:15 am.

One worker died when the ambulance arrived.

The others had been unconscious for up to 3 hours, and were semi-conscious or drowsy on arrival at the hospital at 7:30 am and had no memory of smelling methylene chloride.

All survivors were coughing when they reached the hospital. Some had a slight fever for a day or two, and one complained of eye irritation. All had moderate leukocytosis, and moderate depression of red cell counts and hemoglobin level. They were discharged after 4 to 8 days.

Analysis of the lungs of the man found dead revealed a concentration of 265 ppm.

The Acute Toxicity Range for Inhalation Toxicity Category 2 – FATAL IF INHALED
>100 to ≤ 500

Seventeen workers have died from over-exposure to methylene chloride between 2000 and 2015, and probably at least as many consumers.

<http://jordanbarab.com/confinedspace/2017/12/08/methylene-chloride-deaths/>

RESOURCES

ILO (International Labor Organization) - International Chemical Safety Cards (ICSCs)

<https://www.ilo.org/dyn/icsc/showcard.listCards3>

NIOSH Pocket Guide to Chemical Hazards

<https://www.cdc.gov/niosh/npg/default.html>

OSHA Occupational Chemical Database

<https://www.osha.gov/chemicaldata/>

The Safety Data Sheet – A Guide to First-Aid Recommendations

<https://www.ccohs.ca/products/publications/firstaid/>

Medical Management Guidelines for Acute Chemical Exposures

<https://www.osha.gov/dsg/hazcom/firstaid.html>

PHMSA Emergency Response Guidebook

<https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/ERG2016.pdf>

Results of Survey Regarding the First Aid Information

<https://wonder.cdc.gov/wonder/prevguid/p0000016/p0000016.asp>



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