SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name: COBALT(II) CHLORIDE HEXAHYDRATE
Chemical Name: cobalt(II) chloride hexahydrate
Synonyms: CI2-Co, CoCl2.xH2O, Cobalt (II) chloride hexahydrate GR ACS, ISO, cobalt chloride hexahydrate, cobalt dichloride hexahydrate, cobaltous chloride hexahydrate, hydrated cobalt dichloride
Proper shipping name: CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains cobalt(II) chloride hexahydrate)
Chemical formula: CI2-Co.6H2-O
Other means of identification:
CAS number: 7791-13-1

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Used as absorbent for ammonia, gas masks, electroplating, sympathetic inks, hygrometers, manufacture of vitamin B12, flux for magnesium refining, solid lubricant, dye mordant, catalyst, in barometers. Also used as laboratory reagent, fertiliser additive and beer foam stabilizer, and in medicinal use.

Details of the supplier of the safety data sheet

Registered company name: VWR International, Pty Ltd
Address: Unit 1/31 Archimedes Place 4172 QLD Australia
Telephone: 61 7 3009 4100 ; 1300 727 696
Fax: 61 7 3009 4199 ; 1300 135 123
Website: http://au.vwr.com
Email: csaus@au.vwr.com

Emergency telephone number

Association / Organisation:
Emergency telephone numbers: 61 7 3009 4100 ; 1300 727 696
Other emergency telephone numbers: 61 7 3009 4100 ; 1300 727 696

SECTION 2 Hazards identification

Classification of the substance or mixture

HAZARDOUS CHEMICAL. DANGEROUS GOODS. According to the Model WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

<table>
<thead>
<tr>
<th>Hazard Type</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>0</td>
</tr>
<tr>
<td>Toxicity</td>
<td>2</td>
</tr>
<tr>
<td>Body Contact</td>
<td>3</td>
</tr>
<tr>
<td>Reactivity</td>
<td>3</td>
</tr>
<tr>
<td>Chronic</td>
<td>3</td>
</tr>
</tbody>
</table>

Poisons Schedule: None

GHS Classification[1]:
- Respiratory Sensitizer Category 1, STOT - SE (Resp. Irr.) Category 3, Carcinogen Category 1A, Reproductive Toxicity Category 1B, Chronic Aquatic Hazard Category 1, Skin Corrosion/Irritation Category 1A, Skin Sensitizer Category 1, Metal Corrosion Category 1, Serious Eye Damage Category 1, Acute Toxicity (Oral) Category 4


Label elements

GHS label elements

Signal word: DANGER

Hazard statement(s):
- H290 May be corrosive to metals
- H302 Harmful if swallowed
- H314 Causes severe skin burns and eye damage
- H317 May cause an allergic skin reaction
- H318 Causes serious eye damage
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
SECTION 3 Composition / information on ingredients

### Substances

<table>
<thead>
<tr>
<th>CAS No</th>
<th>% [weight]</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>7791-13-1</td>
<td>100</td>
<td>cobalt(II) chloride hexahydrate</td>
</tr>
</tbody>
</table>

### Mixtures

See section above for composition of Substances

SECTION 4 First aid measures

#### Description of first aid measures

##### Eye Contact:

- If this product comes in contact with the eyes:
  - immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

##### Skin Contact:

- If skin contact occurs:
  - Immediately remove all contaminated clothing, including footwear.
  - Flush skin and hair with running water (and soap if available).
  - Seek medical attention in event of irritation.

##### Inhalation:

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital or doctor without delay.
- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

**Ingestion:**

**IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.**

- For advice, contact a Poisons Information Centre or a doctor.
- Urgent hospital treatment is likely to be needed.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient’s condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

**Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:**

**INDUCE vomitting with fingers down the back of the throat,** ONLY IF CONSCIOUS.

Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

**NOTE:** Wear a protective glove when inducing vomiting by mechanical means.

**Indication of any immediate medical attention and special treatment needed**

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricoidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

**INGESTION:**

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- **DO NOT** attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

**SKIN:**

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

**EYES:**

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT** use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

**BIological Exposure Index (BEI)**

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Sampling time</th>
<th>Index (ug/L)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt in urine</td>
<td>End of shift at end of workweek</td>
<td>15</td>
<td>B</td>
</tr>
<tr>
<td>Cobalt in blood</td>
<td>End of shift at end of workweek</td>
<td>1</td>
<td>B, SQ</td>
</tr>
</tbody>
</table>

**B**: Background levels occur in specimens collected from subjects NOT exposed

**SQ**: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

**SECTION 5 Firefighting measures**

**Extinguishing media**

- **DO NOT** use halogenated fire extinguishing agents.
- Water spray or fog.
- Foam.

**Special hazards arising from the substrate or mixture**

**Fire Incompatibility:**

None known.

**Advice for firefighters**

**Fire Fighting:**

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.

**Fire/Explosion Hazard:**

- Non combustible.
- Not considered to be a significant fire risk.
- Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

**SECTION 6 Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**

**Minor Spills:**

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.

**Major Spills:**
SECTION 7 Handling and storage

Precautions for safe handling

Safe handling

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- **WARNING:**

Other information

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Conditions for safe storage, including any incompatibilities

Suitable container:

- **DO NOT** use aluminium or galvanised containers
- Check regularly for spills and leaks
- Glass container is suitable for laboratory quantities

Storage incompatibility:

- Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pHs of less than 7.0.
- Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces.
- The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat.

Package Material Incompatibilities:

SECTION 8 Exposure controls / personal protection

Control parameters

**Occupational Exposure Limits (OEL)**

**INGREDIENT DATA**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TEEL-0</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
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<tbody>
<tr>
<td>cobalt(II) chloride hexahydrate</td>
<td>0.0808(ppm)</td>
<td>0.242(ppm)</td>
<td>20(ppm)</td>
<td>80.8(ppm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Original IDLH</th>
<th>Revised IDLH</th>
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</thead>
<tbody>
<tr>
<td>COBALT(II) CHLORIDE HEXAHYDRATE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Exposure controls**

**Appropriate engineering controls**

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

- Process controls which involve changing the way a job activity or process is done to reduce the risk.

**Personal protection**

**Eye and face protection:**

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task.

**Skin protection:**

See Hand protection below

**Hand protection:**

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber

**NOTE:**

The material may produce skin sensitisation in predisposed individuals.

**Body protection:**

See Other protection below

**Other protection:**

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

**Thermal hazards:**

**Recommended material(s):**

- Respiratory protection:

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
Information on basic physical and chemical properties

Appearance

Physical state
Divided Solid

Odour
Not applicable

Odour threshold
Not applicable

pH (as supplied)
Not applicable

Melting point / freezing point (°C)
87

Initial boiling point and boiling range (°C)
1049

Flash point (°C)
Not applicable

Evaporation rate
Not applicable

Flammability

Upper Explosive Limit (%)
Not applicable

Lower Explosive Limit (%)
Not applicable

Vapour pressure (kPa)
5.32 @ 770 degC

Solubility in water (g/L)
Miscible

Vapour density (Air = 1)
Not applicable

Relative density (Water = 1)
3.356

Partition coefficient n-octanol / water

Auto-ignition temperature (°C)
Not applicable

Decomposition temperature

Viscosity (cSt)
Not Applicable

Molecular weight (g/mol)
237.94

Taste

Explosive properties

Oxidising properties

Surface Tension (dyn/cm or mN/m)

Volatile Component (%vol)
Not applicable

Gas group

pH as a solution(1%)
4.2 @ 0.2M

SECTION 10 Stability and reactivity

Reactivity:
See section 7

Chemical stability:
- Contact with alkaline material liberates heat
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

Possibility of hazardous reactions:
See section 7

Conditions to avoid:
See section 7

Incompatible materials:
See section 7

Hazardous decomposition products:
See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled:
Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.

Ingestion:
Ingestion of acidic corrosives may produce circumoral burns with a distinct discolouration of the mucous membranes of the mouth, throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Oedema of the epiglottis may produce respiratory distress and possibly, asphyxia. Nausea, vomiting, diarrhoea and a pronounced thirst may occur.

Skin Contact:
Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum.

Eye:
When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation. Direct eye contact with acid corrosives may produce pain, lachrymation, photophobia and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possible irreversible damage.

Chronic:
Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. Practical evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a substantial number of individuals at a greater frequency than would be expected from the response of a normal population.

Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases.

TOXICITY

IRRITATION

Cobalt(II) chloride hexahydrate
Intraperitoneal (Rat) LD50: 35 mg/kg
Oral (Rat) LD50: 766 mg/kg  
Eye - irritant  
Oral (rat) LD50: 80 mg/kg  
Skin - irritant  
* Value obtained from manufacturer's msds  
unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances  

**COBALT(II) CHLORIDE HEXAHYDRATE**  
The following information refers to contact allergens as a group and may not be specific to this product.  
Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions.

**Acute Toxicity:**  
Acute Toxicity (Oral) Category 4  
Skin Irritation/Corrosion:  
Serious Eye Damage/Irritation:  
Respiratory or Skin sensitisation:  
Mutagenicity:  
Carcinogenicity:  
Reproductivity:  
Serious Eye Damage Category 1  
Respiratory Sensitizer Category 1  
Skin Corrosion/Irritation Category 1A  
STOT - Single Exposure:  
STOT - SE (Resp. Irr.) Category 3  
STOT - Repeated Exposure:  
Aspiration Hazard:  
Carcinogen Category 1A  
Reproductive Toxicity Category 1B  
Not Applicable  

**CMR STATUS**

**SECTION 12 Ecological information**

**Toxicity**  
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.  
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

**Persistence and degradability**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**Mobility in soil**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SECTION 13 Disposal considerations**

**Waste treatment methods**

**Product / Packaging disposal:**
- Containers may still present a chemical hazard/danger when empty.
- Return to supplier for reuse/recycling if possible.

**Otherwise:**
- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.

**SECTION 14 Transport information**

**Labels Required:**

**Marine Pollutant**

**HAZCHEM: 2X**

**Land transport (ADG)**

<table>
<thead>
<tr>
<th>UN number</th>
<th>3260</th>
<th>Packing group</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains cobalt(II) chloride hexahydrate)</td>
<td>Environmental hazard</td>
<td>No relevant data</td>
</tr>
</tbody>
</table>
| Transport hazard class(es) | Class: 8 | Special precautions for use | Special provisions: 274  
limited quantity: 1 kg |

**Air transport (ICAO-IATA / DGR)**

<table>
<thead>
<tr>
<th>UN number</th>
<th>3260</th>
<th>Packing group</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>Corrosive solid, acidic, inorganic, n.o.s.* (contains cobalt(II) chloride hexahydrate)</td>
<td>Environmental hazard</td>
<td>No relevant data</td>
</tr>
</tbody>
</table>
| Transport hazard class(es) | ICAO/IATA Class: 8 | Special precautions for use | Special provisions: A3A803  
Cargo Only Packing Instructions: 863  
Cargo Only Maximum Qty / Pack: 50 kg  
Passenger and Cargo Packing Instructions: 859  
Passenger and Cargo Maximum Qty / Pack: 15 kg |
Passenger and Cargo Limited Quantity
Packing Instructions: Y844
Passenger and Cargo Maximum Qty / Pack: 5 kg

Sea transport (IMDG-Code / GGVSee)

<table>
<thead>
<tr>
<th>UN number</th>
<th>Packing group</th>
<th>UN proper shipping name</th>
<th>Environmental hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>296</td>
<td>II</td>
<td>CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains cobalt(II) chloride hexahydrate)</td>
<td>No relevant data</td>
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UN number: 3260
Packing group: II
UN proper shipping name: CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains cobalt(II) chloride hexahydrate)
Environmental hazard: No relevant data

Transport class(ess)
IMDG Class: 8
IMDG Subrisk:
Special precautions for user
EMS Number: F-A,S-B
Special provisions: 274
Limited Quantities: 1 kg

SECTION 15 Regulatory information
Safety, health and environmental regulations / legislation specific for the substance or mixture

cobalt(II) chloride hexahydrate (7791-13-1) is found on the following regulatory lists:

- "Australia Final Report on Hazard Classification of Common Skin Sensitisers"
- "Australia Hazardous Substances Information System - Consolidated Lists"
- "Australia Inventory of Chemical Substances (AICS)"
- "Sigma-Aldrich Transport Information"
- "Acros Transport Information"
- "Regulations concerning the International Carriage of Dangerous Goods by Rail - Table A: Dangerous Goods List - RID 2013 (English)"
- "International Maritime Dangerous Goods Requirements (IMDG Code)"
- "International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index"
- "Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes"
- "Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List"
- "International Air Transport Association (IATA) Dangerous Goods Regulations"
- "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs"
- "Australia National Pollutant Inventory"
- "Australia - South Australia - Work Health and Safety Regulations 2012 - Restricted hazardous chemicals"
- "Australia - New South Wales - Work Health and Safety Regulation 2011 Restricted hazardous chemicals"
- "Australia - Queensland Work Health and Safety Regulation - Restricted hazardous chemicals"
- "Australia - Tasmania - Work Health and Safety Regulations 2012 - Restricted hazardous chemicals"
- "Australia - Northern Territories Work Health and Safety National Uniform Legislation Regulations - Restricted hazardous chemicals"
- "Australia Work Health and Safety Regulations 2011 - Restricted hazardous chemicals"
- "WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established"
- "Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - inorganic chemicals)"
- "Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (STOCK - inorganic chemicals)"
- "Australia - Victoria Drugs, Poisons and Controlled Substances (Precursor Chemicals) Regs 2007 - Schedule 1 - Precursor Chemicals and Quantities"

SECTION 16 Other information
Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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