

SAFETY DATA SHEET

North American Version

EPICHLOROHYDRIN

1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Identification of the substance or preparation

Product name : EPICHLOROHYDRIN
Chemical Name : Epichlorhydrin
Synonyms : 1-chloro-2,3-epoxypropane, 3-chloro-1,2-epoxypropane
Molecular formula : C₃H₅OCl
Molecular Weight : 92,53 g/mol

1.2. Use of the Substance/Preparation

Recommended use : - Chemical intermediate

1.3. Company/Undertaking Identification

Address : SOLVAY CHEMICALS, INC.
3333 RICHMOND AVENUE
HOUSTON TX 77098-3099
United States

1.4. Emergency and contact telephone numbers

Emergency telephone : 1 (800) 424-9300 CHEMTREC® (USA & Canada)
01-800-00-214-00 (MEX. REPUBLIC)

Contact telephone number : US: +1-800-765-8292 (Product information)
(product information): US: +1-513-679-3031 (Product information)

2. HAZARDS IDENTIFICATION

2.1. Emergency Overview:

NFPA : H= 3 F= 3 I= 2 S= None
HMIS : H= 3 F= 3 R= 2 PPE = Supplied by User; dependent on local conditions

General Information

Appearance : liquid
Colour : colourless
Odour : Chloroform

Main effects

- Flammable
- May cause cancer.
- Toxic by inhalation, in contact with skin and if swallowed.
- Causes burns.
- May cause sensitization by skin contact.
- Hazardous decomposition products formed under fire conditions.

2.2. Potential Health Effects:

Inhalation

- irritation of the upper respiratory tract
- In case of repeated or prolonged exposure: headaches, fatigue and risk of nervous system effects.
- Liver injury may occur.
- (in case of higher concentration): Cough, Breathing difficulties, Feelings of intoxication, restlessness, dizziness, nausea, vomiting, drowsiness., Risk of: Lung oedema, chemical pneumonitis.

Eye contact

- Severe eye irritation
- Lachrymation
- Redness
- Risk of temporary eye lesions.

Skin contact

- The product may be absorbed through the skin.
- Painful irritation, delayed appearance.
- Redness
- Swelling of tissue
- Causes burns.
- May cause an allergic skin reaction.

Ingestion

- Severe irritation
- Risk of convulsions, loss of consciousness, deep coma and cardiopulmonary arrest.
- Symptoms: Nausea, Vomiting, Abdominal pain, Diarrhoea.

Other toxicity effects

- See section 11: Toxicological Information

2.3. Environmental Effects:

- See section 12: Ecological Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

Epichlorhydrin

CAS-No. : 106-89-8
Concentration : > 99,0 %

4. FIRST AID MEASURES

4.1. Inhalation

- In case of accident by inhalation: remove casualty to fresh air and keep at rest.
- Victim to lie down in the recovery position, cover and keep him warm.
- Oxygen or artificial respiration if needed.
- If symptoms persist, call a physician.

4.2. Eye contact

- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).
- Immediate medical attention is required.

4.3. Skin contact

- Remove and wash contaminated clothing before re-use.
- Wash off with soap and water.
- If symptoms persist, call a physician.

4.4. Ingestion

- Consult a physician.
- Take victim immediately to hospital.

If victim is conscious:

- If swallowed, rinse mouth with water (only if the person is conscious).
- Do NOT induce vomiting.
- Do not give anything to drink.
- Artificial respiration and/or oxygen may be necessary.

If victim is unconscious but breathing:

- Artificial respiration and/or oxygen may be necessary.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media

- powder
- Foam, AFFF
- Carbon dioxide (CO₂)

5.2. Extinguishing media which shall not be used for safety reasons

- Water spray jet

5.3. Special exposure hazards in a fire

- Flammable
- Heating can release hazardous gases.

5.4. Hazardous decomposition products

- hydrochloric acid
- Carbon monoxide

5.5. Special protective equipment for fire-fighters

- Evacuate personnel to safe areas.
- Wear self-contained breathing apparatus and protective suit.
- Fire fighters must wear fire resistant personnel protective equipment.
- Clean contaminated surface thoroughly.

5.6. Other information

- Cool containers / tanks with water spray.
- Flood the product with water.
- Avoid propagating the fire when directing the extinguishing agent as a jet onto the surface of the burning liquid.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions

- Prevent further leakage or spillage if safe to do so.
- Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions.
- Keep away from open flames, hot surfaces and sources of ignition.
- Cover the spreading liquid with foam in order to slow down the evaporation.
- Keep away from Incompatible products.
- Ventilate the area.
- Refer to protective measures listed in sections 7 and 8.

6.2. Environmental precautions

- Should not be released into the environment.
- If the product contaminates rivers and lakes or drains inform respective authorities.

6.3. Methods for cleaning up

- Dam up.
- Soak up with inert absorbent material.
- Prevent product from entering drains.
- Keep in properly labelled containers.
- Keep in suitable, closed containers for disposal.
- Treat recovered material as described in the section "Disposal considerations".

7. HANDLING AND STORAGE

7.1. Handling

- Used in closed system
- Handle small quantities under a lab hood.
- Keep away from heat and sources of ignition.
- Prevent product vapours decomposition from contacting hot spots.
- Prevent product vapours decomposition from electric arc action (welding).
- Preferably transfer by pump or gravity.
- Use only equipment and materials which are compatible with the product.
- Keep away from incompatible products

7.2. Storage

- Store in original container.
- Keep in a cool, well-ventilated place.
- Keep away from heat and sources of ignition.
- Keep away from incompatible products
- Keep in a banded area.
- Keep container tightly closed.

7.3. Packaging material

- Steel drum
- Stainless steel

7.4. Other information

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Provide electrical equipment safe for hazardous locations.
- Ensure all equipment is electrically grounded before beginning transfer operations.
- Take measures to prevent the build up of electrostatic charge.
- To avoid thermal decomposition, do not overheat.
- Refer to protective measures listed in sections 7 and 8.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure Limit Values

Epichlorhydrin

- US. ACGIH Threshold Limit Values 2006
TWA = 0,5 ppm
Remarks: Skin
- Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2) 10 2006
time weighted average = 0,5 ppm
time weighted average = 1,9 mg/m³
- Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2) 10 2006

- Remarks: Can be absorbed through skin.
- Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) 11 2006
time weighted average = 0,1 ppm
 - Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) 11 2006
Remarks: Can be absorbed through skin.
 - Canada. Ontario OELs. (Ministry of Labor - Control of Exposure to Biological or Chemical Agents) 2007
time weighted average = 0,5 ppm
 - Canada. Ontario OELs. (Ministry of Labor - Control of Exposure to Biological or Chemical Agents) 2007
Remarks: Can be absorbed through skin.
 - US. ACGIH Threshold Limit Values 01 2006
time weighted average = 0,5 ppm
 - US. ACGIH Threshold Limit Values 01 2006
Remarks: Can be absorbed through skin.
 - Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) 2006
time weighted average = 2 ppm
time weighted average = 7,6 mg/m³
Remarks: Exposure must be minimized.
 - Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) 2006
Remarks: Can be absorbed through skin.
 - Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) 2006
Remarks: Recirculation prohibited

8.2. Engineering controls

- Ensure adequate ventilation.
- Provide appropriate exhaust ventilation at machinery.
- Refer to protective measures listed in sections 7 and 8.
- Apply technical measures to comply with the occupational exposure limits.

8.3. Personal protective equipment

8.3.1. Respiratory protection

- Self-contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.

8.3.2. Hand protection

- Wear suitable gloves.
- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
- Suitable material: Neoprene
- Unsuitable material: Leather

8.3.3. Eye protection

- Chemical resistant goggles must be worn.
- If splashes are likely to occur, wear:
 - Goggles
 - Face-shield

8.3.4. Skin and body protection

- Protective suit
- If splashes are likely to occur, wear:
 - Apron
 - Boots
 - Neoprene

8.3.5. Hygiene measures

- Use only in an area equipped with a safety shower.
- Eye wash bottle with pure water
- When using do not eat, drink or smoke.
- High standards of skin care and personal hygiene should be exercised at all times.
- Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General Information

Appearance	: liquid
Colour	: colourless
Odour	: Chloroform

9.2. Important health safety and environmental information

pH	: <i>Remarks: not applicable</i>
Boiling point/boiling range	: 116 °C (241 °F)
Flash point	: 31 °C (88 °F) <i>Method: closed cup</i>
Flammability	: <u>Upper explosion limit:</u> 21 %(V) <u>Lower explosion limit:</u> 3,8 %(V) <i>Remarks: Flammable</i>
Explosive properties	: <u>Explosion danger:</u> <i>Remarks: Heating may cause an explosion.</i>
Oxidizing properties	: <i>Remarks: not applicable</i>
Vapour pressure	: 17 hPa <i>Temperature: 20 °C (68 °F)</i>
Relative density / Density	: 1,18
Solubility	: Water 65 g/l <i>Temperature: 20 °C (68 °F)</i> : Soluble in: : organic solvent
Partition coefficient: n-octanol/water	: <u>log Pow:</u> = 0,3
Viscosity	: 1,12 mPa.s <i>Temperature: 20 °C (68 °F)</i>

Vapour density : 3,2

9.3. Other data

Freezing point: : -57 °C (-71 °F)
Auto-flammability : 385 °C (725 °F)
Decomposition temperature : ca. 225 °C (437 °F)

10. STABILITY AND REACTIVITY

10.1. Stability

- Stable under recommended storage conditions.
- May polymerize in case of heat
- Hazardous Polymerisation/Polymerization: yes

10.2. Conditions to avoid

- To avoid thermal decomposition, do not overheat.
- Keep away from direct sunlight.
- Heat, flames and sparks.
- Keep at temperature not exceeding: 225 °C (437 °F)

10.3. Materials to avoid

- Oxidizing agents, Alcohol, Amines, Organic acids, Alkalis, Anhydrous chlorides of iron, tin and aluminium.

10.4. Hazardous decomposition products

- hydrochloric acid, Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Toxicological data

Acute oral toxicity

- LD50, rat, 90 mg/kg

Acute inhalation toxicity

- LC50, 4 h, rat, 2.403 mg/m³
- LC50, 6 h, rat, 1.362 mg/m³

Acute dermal irritation/corrosion

- LD50, rabbit, from 515 - 754 mg/kg

Skin irritation

- rabbit, corrosive effects

Eye irritation

- rabbit, Eye irritation

Sensitisation

- guinea pig, Skin sensitization

Chronic toxicity

- Inhalation, Prolonged exposure, rat, Target Organs: Upper respiratory tract, male genital system, adrenal glands, Kidney, Liver, NOEL: \geq 10 ppm

Carcinogenicity

- Oral, Prolonged exposure, rat, Target Organs: Gastrointestinal tract, carcinogenic effects
- Inhalation, Prolonged exposure, rat, Target Organs: Upper respiratory tract, carcinogenic effects

Toxicity to reproduction

- Oral, 5 mg/kg, Effects on fertility

Remarks

- Irritating to eyes, respiratory system and skin.
- May cause sensitization by skin contact.
- Liver and kidney injuries may occur.
- Risk of the central nervous system effect
- The carcinogenic effect is not demonstrated in human
- risk of effect to:
- toxic effects for reproduction

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity effects

Acute toxicity

- Fishes, various species, LC50, 96 h, from 10 - 30 mg/l
- Crustaceans, Daphnia sp., LC50, 24 h, from 30 - 40 mg/l

12.2. Mobility

- Water, Evaporates., t1/2: = 29 h
Conditions: river
- Soil/sediments, KOC: = 123
Conditions: calculated value
Remarks: adsorption, not significant
- Air
Remarks: rain washout
- Soil
Remarks: significant evaporation and percolation

12.3. Persistence and degradability

Abiotic degradation

- Air, indirect photo-oxidation, t 1/2 = 4 d
Result: instantaneous degradation
Conditions: sensitizer: OH radicals
- Air, indirect photo-oxidation, t 1/2 = 16 h
Conditions: sensitizer: photochemical smog
- Water, Hydrolysis, t 1/2 = 7 d
Conditions: fresh water, pH 4 - 10, 20 °C
- Water, Hydrolysis, t 1/2 = 5,3 d
Conditions: salt water

Biodegradation

- Tested according to: ready biodegradability/MITI, BOD5 = 0,03
Remarks: weakly biodegradable
- Tested according to: ready biodegradability/MITI, Chemical Oxygen Demand (COD) = 1,16
Remarks: weakly biodegradable
- Tested according to: ready biodegradability/MITI, Chemical Oxygen Demand (COD) = 89, 24 h
Conditions: adapted inoculum
Remarks: Readily biodegradable

12.4. Bioaccumulative potential

- Bioconcentration: Bioconcentration factor (BCF) = 0,66
- log Pow < 3
Result: Does not bioaccumulate.

12.5. Other adverse effects

- no data available

12.6. Remarks

- Harmful to aquatic organisms.
- Nevertheless, hazard for the environment is limited due to product properties:
- Disperses rapidly in air.
- Inherently biodegradable.
- Does not bioaccumulate.
- . weak persistence.

13. DISPOSAL CONSIDERATIONS

13.1. Waste from residues / unused products

- In accordance with local and national regulations.
- Refer to manufacturer/supplier for information on recovery/recycling.
- or
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.
- The incinerator must be equipped with a system for the neutralisation or recovery of HCl.

13.2. Packaging treatment

- Empty containers.
- Dispose of as unused product.
- To avoid treatments, as far as possible, use dedicated containers.
- or
- Rinse the empty containers with a low volatility hydrocarbon and treat the effluent in the same way as waste.

13.3. RCRA Hazardous Waste

- Listed RCRA Hazardous Waste (40 CFR 302) - Yes
- Unlisted RCRA Hazardous Waste (40 CFR 302) - Yes
- D001 (ignitable waste)

14. TRANSPORT INFORMATION

UN-Number	2023
IATA-DGR	
Class	6.1
Sub-risks	Flammable Liquids
Packing group	II
ICAO-Labels	TOXIC + FLAMMABLE LIQUID
Proper shipping name: EPICHLOROHYDRINE	
IMDG	
Class	6.1
Sub-risks	Flammable Liquids
Packing group	II
ICAO-Labels	TOXIC + FLAMMABLE LIQUID + MARINE POLLUTANT
HI/UN No.	2023
Proper shipping name: EPICHLOROHYDRIN	

U.S. Dept of Transportation

Class (Subsidiary)	6.1 (3)
Packing group	II
Label (Subsidiary)	toxic (Flammable liquid)
Marine pollutant:	yes
Emergency info:	ERG: 131P

Proper shipping name: EPICHLOROHYDRINE

Canada (TDG)

Class (Subsidiary)	6.1 (3)
Packing group	II
Label (Subsidiary)	Toxic (Flammable Liquid)
Marine pollutant:	yes
Emergency info:	ERG: 131 P

Proper shipping name: EPICHLOROHYDRINE

15. REGULATORY INFORMATION

15.1. Inventory Information

Toxic Substance Control Act list (TSCA)	: -	In compliance with inventory.
Australian Inventory of Chemical Substances (AICS)	: -	In compliance with inventory.
Canadian Domestic Substances List (DSL)	: -	In compliance with inventory.
Inventory of Existing Chemical Substances (China) (IECS)	: -	In compliance with inventory.
EU list of existing chemical substances (EINECS)	: -	In compliance with inventory.
Japanese Existing and New Chemical Substances (MITI List) (ENCS)	: -	In compliance with inventory.
Korean Existing Chemicals List (ECL)	: -	In compliance with inventory.
Philippine Inventory of Chemicals and Chemical Substances (PICCS)	: -	In compliance with inventory.
New Zealand Inventory (in preparation) (NZ)	: -	In compliance with inventory.

15.2. Other regulations

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

- yes.

SARA Hazard Designation (SARA 311/312)

- Acute Health Hazard: Yes.
- Fire Hazard: Yes.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

- yes.

US. EPA CERCLA Hazardous Substances (40 CFR 302)

- This product is reportable under 40 CFR Part 302.4 because it contains the following substance(s):.

US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

- yes.

US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

- yes.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

- WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm., WARNING! This product contains a chemical known in the State of California to cause cancer..

15.3. Classification and labelling

Canada. Canadian Environmental Protection Act (CEPA). WHMIS Ingredient Disclosure List (Can. Gaz., Part II, Vol. 122, No. 2)

- B2 Flammable Liquid
- D1A Very Toxic Material Causing Immediate and Serious Toxic Effects
- D2A Very Toxic Material Causing Other Toxic Effects
- E Corrosive Material
- Contains a controlled product

Remarks: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

EC Label

- This substance is classified and labelled according to Annex I of Directive 67/548/EEC, as amended.

Symbol(s)	T	Toxic
R-phrase(s)	R45 R10 R23/24/25 R34 R43	May cause cancer. Flammable. Also toxic by inhalation, in contact with skin and if swallowed. Causes burns. May cause sensitization by skin contact.
S-phrase(s)	S53 S45	Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. OTHER INFORMATION

Ratings :

NFPA (National Fire Protection Association)

Health = 3 Flammability = 3 Instability = 2 Special =None

HMIS (Hazardous Material Information System)

Health = 3 Fire = 3 Reactivity = 2 PPE : Supplied by User; dependent on local conditions

Further information

- General revision
- Distribute new edition to clients
- Environmental Protection Agency (EPA) requirements for a Risk Management Plan must be followed anytime at least 20000 lbs. of Epichlorohydrin are used or stored. Refer to 40 CFR 68.150 for specific details.

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of the company mentioned in section 1 in North America. If you are located in a country other than Canada, Mexico or the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location. The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product). To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither the company mentioned in section 1 nor any of its affiliates makes any warranty, express or implied, including merchantability or fitness for use, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use, the manner of use and whether any patents are infringed. This information gives typical properties only and is not to be used for specification purposes. The company mentioned in section 1 reserves the right to make additions, deletions or modifications to the information at any time without prior notification. Trademarks and/or other products of the company mentioned in section 1 referenced herein are either trademarks or registered trademarks of the company mentioned in section 1 or its affiliates, unless otherwise indicated.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

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