Material Safety Data Sheet

Chloroform

1 . Product and company identification

Product name	:	Chloroform
Product code	:	CX1060
Supplier	:	EMD Chemicals Inc. 480 S. Democrat Rd. Gibbstown, NJ 08027 856-423-6300 Technical Service Monday-Friday: 8:00 -5:00 PM
Synonym	:	Trichloromethane
Material uses	:	Other non-specified industry: Analytical reagent.
Validation date	:	4/2/2009.
In case of emergency	:	800-424-9300 CHEMTREC (USA) 613-996-6666 CANUTEC (Canada) 24 Hours/Day: 7 Days/Week

2 . Hazards identification

Emergency overview :

WARNING!

HARMFUL IF INHALED OR SWALLOWED.
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
SUSPECT CANCER HAZARD - MAY CAUSE CANCER.
MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: KIDNEYS, LIVER, HEART, SKIN, EYES, CENTRAL NERVOUS SYSTEM.

WARNING: This product contains a chemical known to the State of California to cause cancer.

Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Physical state	:	Liquid. [Colorless.]
OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	:	Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation	:	Toxic by inhalation. Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion	:	Toxic if swallowed. Aspiration hazard if swallowed. Can enter lungs and cause damage.
Skin	:	Irritating to skin.
Eyes	:	Irritating to eyes.

Potential chronic health effects

Carcinogenicity	:	May cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.
Target organs	:	May cause damage to the following organs: kidneys, liver, heart, skin, eyes, central nervous system (CNS).
Medical conditions aggravated by over-exposure	:	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

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3 . Composition/information on ingredients

Name	CAS number	% by weight
Chloroform	67-66-3	100

4 . First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Emits very toxic fumes when heated to decomposition.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container.

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7 . Handling and storage

Handling : Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container, protected from direct sunlight. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Chloroform	**ACGIH (United States, 1996).** TWA: 49 mg/m³ **OSHA (United States, 1989).** TWA: 9.78 mg/m³ **ACGIH TLV (United States, 1/2008).** TWA: 10 ppm 8 hour(s). TWA: 49 mg/m³ 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** TWA: 2 ppm 8 hour(s). TWA: 9.78 mg/m³ 8 hour(s). **NIOSH REL (United States, 6/2008).** STEL: 2 ppm 60 minute(s). STEL: 9.78 mg/m³ 60 minute(s). **OSHA PEL (United States, 11/2006).** CEIL: 50 ppm CEIL: 240 mg/m³

Consult local authorities for acceptable exposure limits.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Viton

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: splash goggles

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: lab coat

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

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9 . Physical and chemical properties

Physical state	:	Liquid. [Colorless.]
Color	:	Colorless.
Odor	:	Pleasant. Ethereal.
Molecular weight	:	119.37 g/mole
Molecular formula	:	CHCl3
pH	:	Not available.
Boiling/condensation point	:	60.5°C (140.9°F)
Melting/freezing point	:	-63°C (-81.4°F)
Critical temperature	:	263.3°C (505.9°F)
Relative density	:	1.49
Vapor pressure	:	22.3 kPa (167 mm Hg)
Vapor density	:	4.1 [Air = 1]
Volatility	:	100% (v/v)
Odor threshold	:	205 ppm
Evaporation rate	:	10.2 (Butyl acetate. = 1)
VOC	:	100 (%)
Solubility	:	Partially soluble in the following materials: water

10 . Stability and reactivity

Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	:	Avoid exposure - obtain special instructions before use. Do not swallow.
Materials to avoid	:	Reactive or incompatible with the following materials: oxidizing materials, metals and alkalis.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Conditions of reactivity	:	Emits very toxic fumes when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Test	Route	Species	Result
Chloroform	LD50	Intraperitoneal	Rat	894 mg/kg
	LD50	Oral	Rat	695 mg/kg
	LD50	Oral	Rat	300 mg/kg
	LD50	Oral	Mouse	36 mg/kg
	LD50	Dermal	Rabbit	>20 g/kg
	LD50	Oral	Rat	1250 mg/kg
	LDLo	Oral	Man	2514 mg/kg
	LDLo	Oral	Rabbit	500 mg/kg
	TDLo	Oral	Rat	0.5 mL/kg
	TDLo	Oral	Rat	14.9 mg/kg
	TDLo	Oral	Rat	119.37 mg/kg
	TDLo	Intraperitoneal	Rat	0.5 mL/kg
	TDLo	Intraperitoneal	Rat	180 mg/kg
	LC50	Inhalation Vapor	Rat	6000 mg/m3
	LC50	Inhalation	Rat	47702 mg/m3

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11 . Toxicological information

	Vapor		
	LC50 Inhalation Vapor	Rat	47702 mg/m³

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Chloroform	A3	2B	-	+	Possible	-

May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity

No known significant effects or critical hazards.

Teratogenicity

No known significant effects or critical hazards.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Chloroform	Acute EC50 950 mg/L	Algae	48 hours
	Acute EC50 560 mg/L	Algae	48 hours
	Acute LC50 81.5 to 106 mg/L Marine water	Crustaceans - Northern pink shrimp - Penaeus duorarum - 35 to 50 mm	48 hours
	Acute LC50 65.7 mg/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Acute LC50 17.1 mg/L	Fish	96 hours
	Acute LC50 16.2 mg/L	Fish	96 hours
	Acute LC50 15.1 mg/L	Fish	96 hours
	Acute LC50 13.3 mg/L	Fish	96 hours
	Acute LC50 17.1 ppm Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 16.2 ppm Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	Acute LC50 15.1 ppm Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 13.3 ppm Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	Acute LC50 13300 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 17.1 cm - 126.4 g	96 hours
	Acute LC50 758000 to 850000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Young - <=24 hours	48 hours
	Acute LC50 353000 to 512000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <12 hours	48 hours
	Acute LC50 290000 to 512000 ug/L Fresh water	Daphnia - Water flea - Ceriodaphnia dubia - Neonate - <12 hours	48 hours
	Acute LC50 66800 to 71900 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate	48 hours
	Acute LC50 66500 to 78500 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate	48 hours
	Acute LC50 16200 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 16.9 cm - 129.9 g	96 hours
	Acute LC50 63800 to	Daphnia - Water flea -	48 hours

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12 . Ecological information

78000 ug/L Fresh water	Daphnia magna - Neonate	
Acute LC50 15100 to 22100 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
Acute LC50 29000 to 47000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	48 hours
Acute LC50 15100 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling) - 11.5 cm - 16.8 g	96 hours
Acute LC50 17100 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling) - 8.8 cm - 7.6 g	96 hours
Acute LC50 13300 to 20800 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours

Environmental effects : No known significant effects or critical hazards.

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1888	CHLOROFORM	6.1	III		**Reportable quantity** 10 lbs. (4.54 kg)

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Toxic material
Irritating material
Carcinogen
Target organ effects

U.S. Federal regulations : **United States inventory (TSCA 8b):** This material is listed or exempted.
TSCA 8(d) H and S data reporting: Chloroform : 1987

TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory.

SARA 302/304/311/312 extremely hazardous substances: Chloroform
SARA 302/304 emergency planning and notification: Chloroform
SARA 302/304/311/312 hazardous chemicals: Chloroform
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Chloroform : Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: Chloroform

Clean Water Act (CWA) 311: Chloroform

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15 . Regulatory information

Clean Air Act (CAA) 112 accidental release prevention: Chloroform

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: Chloroform

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Chloroform	67-66-3	100
Supplier notification	:	Chloroform	67-66-3	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Massachusetts Substances : This material is listed.

New Jersey Hazardous Substances : This material is listed.

New York Acutely Hazardous Substances : This material is listed.

Pennsylvania RTK Hazardous Substances : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Chloroform	Yes.	No.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists : **CEPA Toxic substances:** This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

CEPA DSL / CEPA NDSL : This material is listed or exempted.

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.

EU regulations

Hazard symbol or symbols :

Risk phrases : R40- Limited evidence of a carcinogenic effect.
R22- Harmful if swallowed.
R48/20/22- Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R38- Irritating to skin.

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15 . Regulatory information

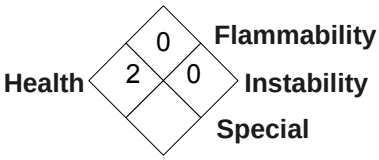
Safety phrases : S2- Keep out of the reach of children.
S36/37- Wear suitable protective clothing and gloves.

International regulations

International lists : **Australia inventory (AICS):** This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory (ENCS): This material is listed or exempted.
Japan inventory (ISHL): Not determined.
Korea inventory (KECI): This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

16 . Other information

National Fire Protection Association (U.S.A.) :



Other special considerations : Contains stabilizer. (<1% wt/wt)

Notice to reader

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