

Material Safety Data Sheet

Chloroform

Section 1 - Chemical Product

MSDS Name: Chloroform

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-66-3	Chloroform	99+	200-663-8
64-17-5	Ethyl alcohol	0.75	200-578-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid.

Warning! Causes eye, skin, and respiratory tract irritation. May be harmful if swallowed or inhaled. May cause central nervous system depression. May cause cancer based on animal studies. May cause cardiac disturbances. This substance has caused adverse reproductive and fetal effects in animals. Light sensitive.

Target Organs: Kidneys, heart, central nervous system, liver, eyes, reproductive system, skin.

Eye: May cause severe eye irritation. Causes eye irritation.

Skin: Causes skin irritation. May be absorbed through the skin in harmful amounts. Contact with chloroform can cause moderate to severe irritation, based on human and animal information. Chloroform can be absorbed through the skin, based on animal information. Corrosive effects have been observed, but only following prolonged application, like for 24 hours.

Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver damage. May cause cardiac disturbances. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. Possible aspiration hazard. May cause hallucinations and distorted perceptions.

Inhalation: May cause liver and kidney damage. May cause cardiac sensitization and

possible failure. Exposure produces central nervous system depression. Inhalation of large amounts may cause respiratory stimulation, followed by respiratory depression, convulsions and possible death due to respiratory paralysis. Causes irritation of the mucous membrane and upper respiratory tract. Harmful effects on the liver and kidneys, and some deaths, have been reported from historical use of chloroform as an anesthetic agent, at concentrations between 8000 and 20000 ppm.

Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects. Toxicity may be increased by exposure to alcohol, steroids, and ketones. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Causes cardiac sensitization to endogenous catecholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine or pseudoepinephrine. Persons with liver, kidney, or central nervous system diseases may be at increased risk from exposure to this product. Alcoholic beverage consumption may enhance the toxic effects of this substance. Effects may be delayed.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material will not burn. Vapors may accumulate in confined spaces. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Chloroform can decompose at high temperatures forming toxic and corrosive gases such as phosgene, hydrogen chloride, and chlorine.

Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.

Flash Point: None

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Do not breathe dust, mist, or vapor. Do not ingest or inhale. Store protected from light.

Storage: Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from strong bases.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chloroform	10 ppm TWA	500 ppm IDLH	50 ppm Ceiling; 240 mg/m ³ Ceiling
Ethyl alcohol	1000 ppm TWA	1000 ppm TWA; 1900 mg/m ³ TWA 3300 ppm IDLH (10% LEL)	1000 ppm TWA; 1900 mg/m ³ TWA

OSHA Vacated PELs: Chloroform: 2 ppm TWA; 9.78 mg/m³ TWA Ethyl alcohol: 1000 ppm TWA; 1900 mg/m³ TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: sweet, fruity odor - ethereal odor - pleasant odor

pH: Not available.

Vapor Pressure: 160 mm Hg @ 20 deg C

Vapor Density: 4.12 (Air=1)

Evaporation Rate: 11.6 (Butyl acetate=1)

Viscosity: 0.58 cps @ 20 deg C

Boiling Point: 60.5 - 61.5 deg C

Freezing/Melting Point: -63 deg C

Decomposition Temperature: 290 deg C

Solubility: Slightly soluble.

Specific Gravity/Density: 1.492 (Water=1)

Molecular Formula: CHCl₃

Molecular Weight: 119.38

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Light sensitive. Hygroscopic: absorbs moisture or water from the air.

Conditions to Avoid: Light, excess heat, loss of inhibitor.

Incompatibilities with Other Materials: Strong bases, alkali metals, fluorine, dinitrogen tetraoxide, potassium tert-butoxide, powdered aluminum, nitrogen tetroxide, powdered magnesium, disilane, sodium methylate, triisopropylphosphine.

Hazardous Decomposition Products: Hydrogen chloride, chlorine, phosgene gas.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 67-66-3: FS9100000

CAS# 64-17-5: KQ6300000

LD50/LC50:

CAS# 67-66-3:

Draize test, rabbit, eye: 148 mg;

Draize test, rabbit, eye: 20 mg/24H Moderate;

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, mouse: LC50 = 17200 mg/m³/2H;

Inhalation, mouse: LC50 = 6000 mg/m³/6H;

Inhalation, rat: LC50 = 47702 mg/m³/4H;

Inhalation, rat: LC50 = 6000 mg/m³/6H;

Oral, mouse: LD50 = 36 mg/kg;

Oral, rat: LD50 = 695 mg/kg;

Oral, rat: LD50 = 1250 mg/kg;

Skin, rabbit: LD50 = >20 gm/kg;

CAS# 64-17-5:

Draize test, rabbit, eye: 500 mg Severe;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, mouse: LC50 = 39 gm/m³/4H;
Inhalation, rat: LC50 = 20000 ppm/10H;
Oral, mouse: LD50 = 3450 mg/kg;
Oral, rabbit: LD50 = 6300 mg/kg;
Oral, rat: LD50 = 7060 mg/kg;
Oral, rat: LD50 = 9000 mg/kg;

Carcinogenicity:

CAS# 67-66-3:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
- **California:** carcinogen, initial date 10/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 64-17-5:

- **ACGIH:** Not listed.
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Group 1 carcinogen

Epidemiology: No data available.

Teratogenicity: Oral, rat: TDLo = 1260 mg/kg (female 6-15 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) Specific Developmental Abnormalities - musculoskeletal system.; Inhalation, rat: TCLo = 100 ppm/7H (female 6-15 day(s) after conception) Specific Developmental Abnormalities - gastrointestinal system and homeostasis.; Inhalation, mouse: TCLo = 100 ppm/7H (female 8-15 day(s) after conception) Specific Developmental Abnormalities - craniofacial (including nose and tongue).

Reproductive Effects: Inhalation, rat: TCLo = 30 ppm/7H (female 6-15 day(s) after conception) Fertility - other measures of fertility.; Inhalation, rat: TCLo = 300 ppm/7H (female 6-15 day(s) after conception) Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated) and post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).

Mutagenicity: DNA Inhibition: Human, HeLa cell = 19 mmol/L.; Sister Chromatid Exchange: Human, Lymphocyte = 10 mmol/L.; Micronucleus Test: Oral, rat = 4 mmol/kg.; Unscheduled DNA Synthesis: Oral, rat = 1 gm/kg.; Sister Chromatid Exchange: Hamster, Embryo = 100 umol/L.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Channel catfish: LC50 = 75 ppm; 96 Hr; Unspecified
 Fish: Rainbow trout: LC50 = 43.8 mg/L; 96 Hr; Static bioassay
 Fish: Fathead Minnow: LC50 = 129.0 mg/L; 96 Hr; Static bioassay
 (pH = 7.6-8.3)
 Fish: Bluegill/Sunfish: LC50 = 100.0 mg/L; 96 Hr; Static bioassay
 Water flea Daphnia: EC50 = 28.9 mg/L; 48 Hr; Static bioassay
 The majority of the environmental releases from industrial uses are to the atmosphere; releases to water and land will be primarily lost by evaporation and will end up in the atmosphere. Release to the atmosphere may be transported long distances and will photodegrade with a half-life of a few months. Spills and other releases on land will also leach into the groundwater where it will reside for long periods of time.

Environmental: Chloroform will not be expected to bioconcentrate into the food chain but contamination of food is likely due to its use as an extractant and its presence in drinking water.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 67-66-3: waste number U044.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	CHLOROFORM	CHLOROFORM
Hazard Class:	6.1	6.1(9.2)
UN Number:	UN1888	UN1888
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 67-66-3 is listed on the TSCA inventory.

CAS# 64-17-5 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 67-66-3: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 67-66-3: 10 lb final RQ; 4.54 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 67-66-3: 10000 lb TPQ

SARA Codes

CAS # 67-66-3: immediate, delayed.

CAS # 64-17-5: immediate, delayed, fire.

Section 313

This material contains Chloroform (CAS# 67-66-3, 99+%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 67-66-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 67-66-3 is listed as a Hazardous Substance under the CWA. CAS# 67-66-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 67-66-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 67-66-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 64-17-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Chloroform, a chemical known to the state of California to cause cancer. WARNING: This product contains Ethyl alcohol, a chemical known to the state of California to cause developmental reproductive toxicity.

California No Significant Risk Level: CAS# 67-66-3: 20 æg/day NSRL (oral); 40 æg/day NSRL (inhalation)

European/International Regulations**European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

Risk Phrases:

R 22 Harmful if swallowed.

R 38 Irritating to skin.

R 40 Limited evidence of a carcinogenic effect.

R 48/20/22 Harmful : danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

Safety Phrases:

S 36/37 Wear suitable protective clothing and gloves.

WGK (Water Danger/Protection)

CAS# 67-66-3: 3

CAS# 64-17-5: 0

Canada - DSL/NDSL

CAS# 67-66-3 is listed on Canada's DSL List.

CAS# 64-17-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A, D2B, D1B.

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

Canadian Ingredient Disclosure List

CAS# 67-66-3 is listed on the Canadian Ingredient Disclosure List.

CAS# 64-17-5 is listed on the Canadian Ingredient Disclosure List.

