1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Chloroform
Product Number : C2432
Brand : Sigma-Aldrich
Supplier : Sigma-Aldrich
Supplier Address : 3050 Spruce Street
                  SAINT LOUIS MO  63103
                  USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
                         Product Safety - Americas Region
                         1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen, Target Organ Effect, Harmful by ingestion., Irritant

Target Organs
Central nervous system, Blood, Liver, Cardiovascular system., Kidney/Cardiovascular system., Central nervous system, Blood, Liver, Kidney

GHS Classification
Acute toxicity, Oral (Category 4)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Carcinogenicity (Category 2)
Specific target organ toxicity - repeated exposure (Category 2)
Acute aquatic toxicity (Category 3)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302  Harmful if swallowed.
H315  Causes skin irritation.
H319  Causes serious eye irritation.
H351  Suspected of causing cancer.
H373  May cause damage to organs through prolonged or repeated exposure.
H402  Harmful to aquatic life.

Precautionary statement(s)
P281 Use personal protective equipment as required.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
HMIS Classification

- Health hazard: 2
- Chronic Health Hazard: *
- Flammability: 0
- Physical hazards: 0

NFPA Rating

- Health hazard: 2
- Fire: 0
- Reactivity Hazard: 0

Potential Health Effects

- Inhalation: May be harmful if inhaled. Causes respiratory tract irritation.
- Skin: Harmful if absorbed through skin. Causes skin irritation.
- Eyes: Causes eye irritation.
- Ingestion: Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms:
- Trichloromethane
- Methylidyne trichloride

Formula: CHCl₃
Molecular Weight: 119.38 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>67-66-3</td>
</tr>
<tr>
<td>EC-No.</td>
<td>200-663-8</td>
</tr>
<tr>
<td>Index-No.</td>
<td>602-006-00-4</td>
</tr>
</tbody>
</table>

4. 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.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Phosgene, Chlorine
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

6. ACCIDENTAL RELEASE MEASURES
**Personal precautions**
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

**Methods and materials for containment and cleaning up**
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

### 7. HANDLING AND STORAGE

**Precautions for safe handling**
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

**Conditions for safe storage**
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>67-66-3</td>
<td>TWA 10 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**
Central Nervous System impairment Liver damage Embryo/fetal damage Confirmed animal carcinogen with unknown relevance to humans

<table>
<thead>
<tr>
<th></th>
<th>TWA 2 ppm</th>
<th>9.78 mg/m3</th>
<th>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>50 ppm</td>
<td>240 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
</tbody>
</table>

The value in mg/m³ is approximate. Ceiling limit is to be determined from breathing-zone air samples.

<table>
<thead>
<tr>
<th></th>
<th>ST 2 ppm</th>
<th>9.78 mg/m³</th>
<th>USA. NIOSH Recommended Exposure Limits</th>
</tr>
</thead>
</table>

**Potential Occupational Carcinogen**
See Appendix A.

**Personal protective equipment**

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Eye protection**
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin and body protection**
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
- Form: liquid, clear
- Colour: colourless

Safety data
- pH: no data available
- Melting point/freezing point: Melting point/range: -63 °C (-81 °F)
- Boiling point: 60.5 - 61.5 °C (140.9 - 142.7 °F)
- Flash point: no data available
- Ignition temperature: no data available
- Autoignition temperature: no data available
- Lower explosion limit: no data available
- Upper explosion limit: no data available
- Vapour pressure: 213.3 hPa (160.0 mmHg) at 20.0 °C (68.0 °F)
- Density: 1.492 g/mL at 25 °C (77 °F)
- Water solubility: no data available
- Partition coefficient: n-octanol/water: log Pow: 1.97
- Relative vapour density: no data available
- Odour: no data available
- Odour Threshold: no data available
- Evaporation rate: no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents, Strong bases, Magnesium, Sodium/sodium oxides, Lithium

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Phosgene, Chlorine
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - no data available

Contains the following stabiliser(s):
2-Methyl-2-butene (>=0.001 - <=0.015 %)

11. TOXICOLOGICAL INFORMATION
Acute toxicity

Oral LD50
LD50 Oral - rat - 695.0 mg/kg

Inhalation LC50
LC50 Inhalation - rat - 4 h - 47,702 mg/m3

Dermal LD50
LD50 Dermal - rabbit - > 20,000 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Irritating to eyes. - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

Carcinogenicity - rat - Oral
Tumorigenic: Carcinogenic by RTECS criteria. Leukaemia
The National Cancer Institute (NCI) has found clear evidence for carcinogenicity.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform)
NTP: Reasonably anticipated to be a human carcinogen (Chloroform)
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Potential health effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion Harmful if swallowed.
Skin Harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.

Signs and Symptoms of Exposure
Vomiting, Gastrointestinal disturbance, Exposure to and/or consumption of alcohol may increase toxic effects., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**Synergistic effects**
no data available

**Additional Information**
RTECS: FS9100000

### 12. ECOLOGICAL INFORMATION

**Toxicity**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Species &amp; Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 - Toxicity to fish</td>
<td>Leuciscus idus (Golden orfe) - 162 mg/l - 48 h</td>
</tr>
<tr>
<td>LC100 - Toxicity to fish</td>
<td>Leuciscus idus (Golden orfe) - 220 mg/l - 48 h</td>
</tr>
<tr>
<td>LC50 - Toxicity to other fish</td>
<td>97 mg/l - 96 h</td>
</tr>
<tr>
<td>LC50 - Toxicity to Danio rerio</td>
<td>121 mg/l - 96 h</td>
</tr>
<tr>
<td>NOEC - Toxicity to Oryzias latipes</td>
<td>122 mg/l - 10 d</td>
</tr>
<tr>
<td>NOEC - Toxicity to Oncorhynchus mykiss</td>
<td>24 mg/l - 96 h</td>
</tr>
</tbody>
</table>

**Toxicity to daphnia and other aquatic invertebrates**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 - Toxicity to daphnia</td>
<td>79.00 mg/l - 24 h</td>
</tr>
<tr>
<td>NOEC - Toxicity to Daphnia magna</td>
<td>120 mg/l - 11 d</td>
</tr>
</tbody>
</table>

**Immobilization**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 - Immobilization</td>
<td>51.6 mg/l - 48 h</td>
</tr>
<tr>
<td>NOEC - Immobilization</td>
<td>120 mg/l - 11 d</td>
</tr>
</tbody>
</table>

**Toxicity to algae**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 - Toxicity to algae</td>
<td>500.00 mg/l - 24 h</td>
</tr>
</tbody>
</table>

**Persistence and degradability**
no data available

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Species &amp; Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioaccumulation</td>
<td>Lepomis macrochirus (Bluegill) - 14 d</td>
</tr>
<tr>
<td>Bioconcentration factor (BCF)</td>
<td>6</td>
</tr>
</tbody>
</table>

**Mobility in soil**
no data available

**PBT and vPvB assessment**
no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life.

### 13. DISPOSAL CONSIDERATIONS

**Product**
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

**Contaminated packaging**
Dispose of as unused product.

### 14. TRANSPORT INFORMATION

**DOT (US)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>1888</td>
</tr>
<tr>
<td>Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>Chloroform</td>
</tr>
<tr>
<td>Reportable Quantity (RQ)</td>
<td>10 lbs</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>No</td>
</tr>
</tbody>
</table>
Poison Inhalation Hazard: No

**IMDG**
- UN number: 1888  
  - Class: 6.1  
  - Packing group: III  
  - EMS-No: F-A, S-A  
- Proper shipping name: CHLOROFORM  
- Marine pollutant: No

**IATA**
- UN number: 1888  
  - Class: 6.1  
  - Packing group: III  
- Proper shipping name: Chloroform

### 15. REGULATORY INFORMATION

**OSHA Hazards**
- Carcinogen, Target Organ Effect, Harmful by ingestion., Irritant

**SARA 302 Components**
The following components are subject to reporting levels established by SARA Title III, Section 302:

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

**SARA 313 Components**
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
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<th>CAS-No.</th>
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</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

**SARA 311/312 Hazards**
- Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

**Pennsylvania Right To Know Components**

<table>
<thead>
<tr>
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<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

**New Jersey Right To Know Components**

<table>
<thead>
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<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

**California Prop. 65 Components**

- WARNING! This product contains a chemical known to the State of California to cause cancer.  
<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2008-10-10</td>
</tr>
</tbody>
</table>

- WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.  
<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-66-3</td>
<td>2008-10-10</td>
</tr>
</tbody>
</table>

### 16. OTHER INFORMATION

**Further information**
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