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

1.1 Product identifiers

Product name : Chloroform
Product Number : C2432
Brand : SIGALD
Index-No. : 602-006-00-4
CAS-No. : 67-66-3

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

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
            3050 SPRUCE ST
            ST. LOUIS MO 63103
            UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure (Category 1), Liver, Kidney, H372
Short-term (acute) aquatic hazard (Category 3), H402
Long-term (chronic) aquatic hazard (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.
2.2 **GHS Label elements, including precautionary statements**

**Pictogram**

![Pictogram]

**Signal word**

**Danger**

**Hazard statement(s)**

- **H302**: Harmful if swallowed.
- **H315**: Causes skin irritation.
- **H319**: Causes serious eye irritation.
- **H331**: Toxic if inhaled.
- **H336**: May cause drowsiness or dizziness.
- **H351**: Suspected of causing cancer.
- **H361**: Suspected of damaging fertility or the unborn child.
- **H372**: Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.
- **H412**: Harmful to aquatic life with long lasting effects.

**Precautionary statement(s)**

- **P201**: Obtain special instructions before use.
- **P202**: Do not handle until all safety precautions have been read and understood.
- **P260**: Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
- **P264**: Wash skin thoroughly after handling.
- **P270**: Do not eat, drink or smoke when using this product.
- **P271**: Use only outdoors or in a well-ventilated area.
- **P273**: Avoid release to the environment.
- **P280**: Wear protective gloves/ protective clothing/ eye protection/ face protection.
- **P301 + P312 + P330**: IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
- **P302 + P352**: IF ON SKIN: Wash with plenty of soap and water.
- **P304 + P340 + P311**: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
- **P305 + P351 + P338**: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **P308 + P313**: IF exposed or concerned: Get medical advice/ attention.
- **P332 + P313**: If skin irritation occurs: Get medical advice/ attention.
- **P337 + P313**: If eye irritation persists: Get medical advice/ attention.
- **P362**: Take off contaminated clothing and wash before reuse.
- **P403 + P233**: Store in a well-ventilated place. Keep container tightly closed.
- **P405**: Store locked up.
- **P501**: Dispose of contents/ container to an approved waste disposal plant.

2.3 **Hazards not otherwise classified (HNOC) or not covered by GHS** - none

---

**SECTION 3: Composition/information on ingredients**

3.1 **Substances**

**Synonyms**: Trichloromethane
               Methylidyne trichloride

SIGALD - C2432
The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

**Formula**: \( \text{CHCl}_3 \)

**Molecular weight**: 119.38 g/mol

**CAS-No.**: 67-66-3

**EC-No.**: 200-663-8

**Index-No.**: 602-006-00-4

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; Aquatic Acute 3; H302, H331, H315, H319, H351, H361, H336, H372, H402 STOT SE 3; STOT RE 1;</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

**SECTION 4: First aid measures**

4.1 **Description of first-aid measures**

**General advice**
Consult a physician. Show this material 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. Take victim immediately to hospital. 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.

4.2 **Most important symptoms and effects, both acute and delayed**
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 **Indication of any immediate medical attention and special treatment needed**
No data available
SECTION 5: Firefighting measures

5.1 Extinguishing media

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

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 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.

6.3 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.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapor or mist.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
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.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated
SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Component</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</td>
<td>10 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST</td>
<td>2 ppm 9.78 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Potential Occupational Carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>50 ppm 240 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEL</td>
<td>2 ppm 9.78 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face 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 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.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**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.

**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).

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

### SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

a) Appearance  
Form: liquid, clear  
Color: colorless

b) Odor  
sweet

c) Odor Threshold  
No data available

d) pH  
No data available

e) Melting point/freezing point  
Melting point/range: -63 °C (-81 °F)

f) Initial boiling point and boiling range  
60.5 - 61.5 °C 140.9 - 142.7 °F

gh) Flash point  

h) Evaporation rate  
No data available

i) Flammability (solid, gas)  
No data available

j) Upper/lower flammability or explosive limits  
No data available

k) Vapor pressure  
210 hPa at 20 °C (68 °F)

l) Vapor density  
4.12 - (Air = 1.0)

m) Relative density  
No data available

n) Water solubility  
8.7 g/l at 23 °C (73 °F) - OECD Test Guideline 105

O) Partition coefficient: n-octanol/water  
No data available
p) Autoignition temperature
   No data available

q) Decomposition temperature
   Distillable in an undecomposed state at normal pressure.

r) Viscosity
   No data available

s) Explosive properties
   No data available

t) Oxidizing properties
   No data available

9.2 Other safety information

   Solubility in other organic solvent at 20 °C (68 °F) - miscible
   Relative vapor density 4.12 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
   No data available

10.2 Chemical stability
   Stable under recommended storage conditions.
   Contains the following stabilizer(s):
   2-methyl-2-butene (>=0.001 <=0.015 %)

10.3 Possibility of hazardous reactions
   Risk of explosion with:
   Methanol with
   alcoholates
   Methanol with
   strong alkalis
   Iron in powder form
   various alloys sensitive to shock
   Methanol with
   Sodium hydroxide powdered magnesium
   Oxygen with
   alkali compounds
   Aluminum in powder form
   Acetone with
   alkali compounds
   Potassium sensitive to shock
   sodium sensitive to shock
Violent reactions possible with:
Light metals
Powdered metals
Ketones
phosphines
semimetallic hydrogen compounds
bis(dimethylamino)dimethyl tin
strong oxidising agents
nonmetallic hydrogen compounds
mineral acids

10.4 **Conditions to avoid**
No data available

10.5 **Incompatible materials**
various plastics, Rubber
Strong oxidizing agents

10.6 **Hazardous decomposition products**
In the event of fire: see section 5

---

**SECTION 11: Toxicological information**

11.1 **Information on toxicological effects**

**Acute toxicity**
Acute toxicity estimate Oral - 908 mg/kg
(Calculation method)

LD50 Oral - Rat - male - 908 mg/kg
(OECD Test Guideline 401)

Acute toxicity estimate Inhalation - 4 h - 3.1 mg/l
(Calculation method)
Acute toxicity estimate Inhalation - Expert judgment - 4 h - 3.1 mg/l

Dermal: No data available
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: Irritating to skin. - 24 h
Remarks: (ECHA)
Drying-out effect resulting in rough and chapped skin.

Skin - Rabbit
Result: slight irritation
Remarks: (IUCLID)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Irritating to eyes.
Remarks: (ECHA)
(Regulation (EC) No 1272/2008, Annex VI)
Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative

Germ cell mutagenicity

Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: unscheduled DNA synthesis assay
Test system: Liver
Metabolic activation: without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Rat
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

Test Type: in vivo assay
Species: Mouse
Application Route: Inhalation
Result: negative
Remarks: (ECHA)

Carcinogenicity
Suspected of causing cancer.
IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform)
NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

Reproductive toxicity
Suspected of damaging the unborn child.
Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
Oral - Causes damage to organs through prolonged or repeated exposure. - Liver, Kidney

Aspiration hazard
No data available

11.2 Additional Information
Repeated dose toxicity - Rat - female - Oral - NOAEL (No observed adverse effect level) - 34 mg/kg
RTECS: FS9100000

Vomiting, Cough, irritant effects, Shortness of breath, respiratory arrest, narcosis, Dizziness, Nausea, agitation, spasms, inebriation, Headache, Stomach/intestinal disorders, ataxia (impaired locomotor coordination), cardiovascular disorders
Drying-out effect resulting in rough and chapped skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
Toxicity to algae static test ErC50 - Chlamydomonas reinhardtii (green algae) - 13.3 mg/l - 72 h
Remarks: (ECHA)
(Chloroform)

Toxicity to bacteria Remarks: (ECHA)
(Chloroform)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

SIGALD - C2432
SECTION 13: Disposal considerations

13.1 Waste treatment methods

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.

SECTION 14: Transport information

DOT (US)
UN number: 1888  Class: 6.1  Packing group: III
Proper shipping name: Chloroform
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

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

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

SECTION 15: Regulatory information

SARA 302 Components
Chloroform  CAS-No.  Revision Date
67-66-3  2008-11-03

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:
Chloroform  CAS-No.  Revision Date
67-66-3  2008-11-03

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

Reportable Quantity  D022 lbs

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

**Pennsylvania Right To Know Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>67-66-3</td>
<td>2008-11-03</td>
</tr>
</tbody>
</table>

**SECTION 16: Other information**

**Further information**

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