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

1.1 Product identifiers

Product name : Tetrachloroethylene
Product Number : 371696
Brand : Sigma-Aldrich
Index-No. : 602-028-00-4
CAS-No. : 127-18-4

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)

Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitization (Category 1), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

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

2.2 GHS Label elements, including precautionary statements
2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms : Perchloroethylene
            PCE

Formula : C₂Cl₄
Molecular weight : 165.83 g/mol
CAS-No. : 127-18-4
EC-No. : 204-825-9
Index-No. : 602-028-00-4
<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorethylene</td>
<td>Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 2; STOT SE 3; Aquatic Acute 2; Aquatic Chronic 2; H315, H319, H317, H351, H336, H401, H411</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
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). 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
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.
5.2 **Special hazards arising from the substance or mixture**
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 **Advice for firefighters**
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 **Further information**
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

---

**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 **Environmental precautions**
Do not let product enter drains.

6.3 **Methods and materials for containment and cleaning up**
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb® ). Dispose of properly. Clean up affected area.

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*
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

*Hygiene measures*
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**

*Storage conditions*
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

*Storage class*
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which 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>Tetrachlorethylene</td>
<td>127-18-4</td>
<td>TWA</td>
<td>25 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Confirmed animal carcinogen with unknown relevance to humans</td>
<td></td>
</tr>
<tr>
<td>STEL</td>
<td></td>
<td>100 ppm</td>
<td></td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Confirmed animal carcinogen with unknown relevance to humans</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Potential Occupational Carcinogen</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>100 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td>CEIL</td>
<td></td>
<td>200 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td>300 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td>PEL</td>
<td></td>
<td>25 ppm 170 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
<td></td>
</tr>
<tr>
<td>STEL</td>
<td></td>
<td>100 ppm 685 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>300 ppm</td>
<td></td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

**Biological occupational exposure limits**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorethylene</td>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>3 parts per million</td>
<td>In end-exhaled air</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prior to shift (16 hours after exposure ceases)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tetrachloroethylene</td>
<td>0.5 mg/l</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prior to shift (16 hours after exposure ceases)</td>
<td></td>
</tr>
</tbody>
</table>
8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

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

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 240 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: liquid, clear
   Color: colorless

b) Odor
   No data available

c) Odor Threshold
   No data available

d) pH
   No data available
e) Melting point/freezing point
Melting point/range: -22 °C (-8 °F) - lit.

f) Initial boiling point and boiling range
121 °C 250 °F - lit.

g) Flash point
() No data available

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
25.3 hPa at 25.0 °C (77.0 °F)
17.3 hPa at 20.0 °C (68.0 °F)

l) Vapor density
No data available

m) Density
1.623 g/cm³ at 25 °C (77 °F) - lit.
Relative density
No data available

n) Water solubility
0.15 g/l at 25 °C (77 °F)

o) Partition coefficient: n-octanol/water
log Pow: 2.53 at 23 °C (73 °F) - Bioaccumulation is not expected.

p) Autoignition temperature
No data available

q) Decomposition temperature
No data available

r) Viscosity
No data available

s) Explosive properties
No data available

t) Oxidizing properties
No data available

9.2 Other safety information
Surface tension
32.1 mN/m at 20 °C (68 °F)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
Risk of explosion with:
Alkali metals
Aluminum
sodium amide
Barium
nitrogen dioxide
Oxygen

Sigma-Aldrich - 371696
with alkali hydroxides
Exothermic reaction with:
strong alkalis
Alkaline earth metals
strong alkalis
Light metals
Powdered metals
Oxidizing agents
Strong acids
Strong bases
nitrous gases
Risk of ignition or formation of inflammable gases or vapours with:
zinc oxide
with Aluminum

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
various plastics

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
LD50 Oral - Rat - male and female - 3,420 mg/kg
(OECD Test Guideline 401)
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h
(OECD Test Guideline 404)
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: May cause sensitization by skin contact.
(OECD Test Guideline 429)
Remarks: (ECHA)
**Germ cell mutagenicity**
Test Type: Chromosome aberration test in vitro  
Test system: Chinese hamster ovary cells  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 473  
Result: negative  
Remarks: (ECHA)  
Test Type: Ames test  
Test system: Salmonella typhimurium  
Metabolic activation: without metabolic activation  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: (ECHA)

Test Type: Micronucleus test  
Species: Mouse

Application Route: Intraperitoneal  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: (ECHA)

**Carcinogenicity**
Suspected of causing cancer.

IARC: 2A - Group 2A: Probably carcinogenic to humans (Tetrachlorethylene)  
NTP: RAHC - Reasonably anticipated to be a human carcinogen (Tetrachlorethylene)  
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**
No data available

**Specific target organ toxicity - single exposure**
May cause drowsiness or dizziness.

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

11.2 **Additional Information**
Repeated dose toxicity - Mouse - female - Oral - LOAEL (Lowest observed adverse effect level) - 390 mg/kg

RTECS: KX3850000  
narcosis, Liver injury may occur., Kidney injury may occur.

**SECTION 12: Ecological information**

12.1 **Toxicity**
Toxicity to fish flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 5 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 7.50 mg/l - 48 h
Remarks: (ECHA)

Toxicity to algae
ErC50 - Chlamydomonas reinhardtii (green algae) - 3.64 mg/l - 72 h
Remarks: (ECHA)

Toxicity to fish (Chronic toxicity)
flow-through test NOEC - Jordanella floridae - 1.99 mg/l - 10 d
Remarks: (ECHA)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
semi-static test NOEC - Daphnia magna (Water flea) - 0.51 mg/l - 28 d
Remarks: (ECHA)

12.2 Persistence and degradability
Biodegradability
aerobic - Exposure time 28 d
Result: 11 % - Not readily biodegradable.
(OECD Test Guideline 301C)

12.3 Bioaccumulative potential
Bioaccumulation
Lepomis macrochirus (Bluegill) - 21 d
- 0.00343 mg/l (Tetrachlorethylene)
Bioconcentration factor (BCF): 49

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 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1897   Class: 6.1   Packing group: III
Proper shipping name: Tetrachloroethylene
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
   Poison Inhalation Hazard: No

**IMDG**
UN number: 1897   Class: 6.1   Packing group: III   EMS-No: F-A, S-A
Proper shipping name: TETRACHLOROETHYLENE
Marine pollutant : yes

**IATA**
UN number: 1897   Class: 6.1   Packing group: III
Proper shipping name: Tetrachloroethylene

---

**SECTION 15: Regulatory information**

**SARA 302 Components**
This material does not contain any components with a section 302 EHS TPQ.

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

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorethylene</td>
<td>127-18-4</td>
<td>2020-07-14</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Reportable Quantity</th>
<th>D039 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F001 lbs</td>
</tr>
<tr>
<td></td>
<td>F002 lbs</td>
</tr>
</tbody>
</table>

**Massachusetts Right To Know Components**

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorethylene</td>
<td>127-18-4</td>
<td>2020-07-14</td>
</tr>
</tbody>
</table>

**Pennsylvania Right To Know Components**

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorethylene</td>
<td>127-18-4</td>
<td>2020-07-14</td>
</tr>
</tbody>
</table>

**California Prop. 65 Components**
, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.Tetrachlorethylene

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachlorethylene</td>
<td>127-18-4</td>
<td>2017-04-11</td>
</tr>
</tbody>
</table>
SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.7  Revision Date: 03/18/2023  Print Date: 07/22/2023