

1. PRODUCT AND COMPANY IDENTIFICATION

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
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

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 sensitisation (Category 1), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (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

Pictogram



Signal word

Warning

Hazard statement(s)

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer.
H411 Toxic 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.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
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.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
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

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Perchloroethylene PCE
Formula	:	C ₂ Cl ₄
Molecular weight	:	165.83 g/mol
CAS-No.	:	127-18-4
EC-No.	:	204-825-9
Index-No.	:	602-028-00-4

Hazardous components

Component	Classification	Concentration
Tetrachloroethylene	Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 2; STOT SE 3; Aquatic Acute 2; Aquatic Chronic 2; H315, H317, H319, H336, H351, H411	90 - 100 %

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

4. FIRST AID MEASURES

4.1 Description of 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.

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

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

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, 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.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

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.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Components with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
Tetrachloroethylene	127-18-4	TWA	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		STEL	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen Minimize workplace exposure concentrations. See Appendix A		
		See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		STEL	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen Minimize workplace exposure concentrations. See Appendix A		
		See Table Z-2		

		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	25 ppm 170 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	100 ppm 685 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	300 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	25 ppm 170 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Tetrachloroethylene	127-18-4	Tetrachloroethylene	3ppm	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to shift (16 hours after exposure ceases)			
		Tetrachloroethylene	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			
		Tetrachloroethylene	3ppm	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			
		Tetrachloroethylene	0.5 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 49 min
Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, 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 CE 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 ABEK (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.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour 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) Vapour pressure | 25.3 hPa (19.0 mmHg) at 25.0 °C (77.0 °F)
17.3 hPa (13.0 mmHg) at 20.0 °C (68.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.623 g/cm ³ at 25 °C (77 °F) |
| 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) |
| p) Auto-ignition 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)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products

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

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - female - 3,385 mg/kg
(OECD Test Guideline 401)

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)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

- Mouse

Result: May cause sensitisation by skin contact.
(OECD Test Guideline 429)

Germ cell mutagenicity

Hamster

ovary

Result: negative

OECD Test Guideline 474

Mouse - male

Result: negative

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC: 2A - Group 2A: Probably carcinogenic to humans (Tetrachloroethylene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Tetrachloroethylene)

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

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

Additional Information

Repeated dose toxicity Mouse - female - Oral - LOAEL : 390 mg/kg

RTECS: KX3850000

narcosis, Liver injury may occur., Kidney injury may occur.

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

Toxicity to algae static test EC50 - Skeletonema costatum - > 16 mg/l - 7 h

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

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 Other adverse effects

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

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.

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
 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

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

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

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Reportable Quantity	: D039 lbs
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Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Tetrachloroethylene	127-18-4	2007-09-28

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity

Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

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

Further information

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Preparation Information

Sigma-Aldrich Corporation
 Product Safety – Americas Region
 1-800-521-8956

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