

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 1 of 10

1. Identification

Product identifier

TCEP

Substance name: Tris(2-carboxyethyl)phosphine hydrochloride
CAS No: 51805-45-9

Recommended use of the chemical and restrictions on use

Use of the substance/mixture

Use as laboratory reagent. Scientific research and development

Uses advised against

Any non-intended use.

Details of the supplier of the safety data sheet

Company name: Dynamic Biosensors Inc.
Street: 300 Trade Center, Suite 1400
Place: USA-01801 Woburn, MA
Telephone: +1 781 404 6126
Responsible Department: Dr. Gans-Eichler
Chemieberatung GmbH
Otto-Hahn-Str. 36
D-48161 Münster
e-mail: info@tge-consult.de
Tel.: +49(0)2534 6441185
www.tge-consult.de

Emergency phone number: CONTACT (24-Hour-Number): GBK GmbH 01149-6132-84463

2. Hazard(s) identification

Classification of the chemical

29 CFR Part 1910.1200

Skin corrosion/irritation: Skin Corr. 1B

Label elements

29 CFR Part 1910.1200

Signal word: Danger

Pictograms:



Hazard statements

Causes severe skin burns and eye damage

Precautionary statements

Do not breathe dust/fume/gas/mist/vapors/spray.
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Rinse mouth. Do NOT induce vomiting.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Store locked up.
Dispose of contents/container to local/regional/national/international regulations.

Hazards not otherwise classified

The components in this formulation (>0,1%) do not meet the criteria for classification as PBT or vPvB.

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 2 of 10

3. Composition/information on ingredients

Substances

Sum formula: C₉H₁₅O₆P · HCl
Molecular weight: 286,65 g/mol

Hazardous components

CAS No	Components	Quantity
51805-45-9	Tris(2-carboxyethyl)phosphine hydrochloride	100 %

4. First-aid measures

Description of first aid measures

General information

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

After inhalation

In case of accident by inhalation: remove casualty to fresh air and keep at rest. In case of respiratory tract irritation, consult a physician. In the case of lung irritation: Primary treatment using corticoide spray, eg. Auxiloson spray, Pulmicort-dosage-spray. (Auxiloson and Pulmicort are registered trademarks).

After contact with skin

After contact with skin, wash immediately with plenty of water and soap. Take off immediately all contaminated clothing. In case of skin irritation, seek medical treatment.

After contact with eyes

In case of contact with eyes, rinse immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Subsequently consult an ophthalmologist.

After ingestion

Do NOT induce vomiting. Rinse mouth thoroughly with water. Let water be drunken in little sips (dilution effect). Observe risk of aspiration if vomiting occurs. Never give anything by mouth to an unconscious person or a person with cramps. When in doubt or if symptoms are observed, get medical advice.

Most important symptoms and effects, both acute and delayed

If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects).

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Sand. Foam. Carbon dioxide (CO₂). Extinguishing powder. In case of major fire and large quantities: Water spray jet. Water mist.

Unsuitable extinguishing media

High power water jet.

Specific hazards arising from the chemical

Can be released in case of fire: Carbon monoxide Carbon dioxide (CO₂)

Special protective equipment and precautions for fire-fighters

In case of fire and/or explosion do not breathe fumes. In case of fire: Wear self-contained breathing apparatus.

Additional information

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water. Co-ordinate fire-fighting measures to the fire surroundings.

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 3 of 10

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

General advice

Do not breathe vapor or spray. Avoid contact with skin, eyes and clothes.

For non-emergency personnel

Wear personal protection equipment (refer to section 8).

For emergency responders

No special measures are necessary.

Environmental precautions

Do not allow to enter into surface water or drains. Prevent spread over a wide area (e.g. by containment or oil barriers). Do not allow to enter into soil/subsoil.

Methods and material for containment and cleaning up

For containment

Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents).
Treat the recovered material as prescribed in the section on waste disposal.

For cleaning up

Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections

Safe handling: see section 7

Disposal: see section 13

7. Handling and storage

Precautions for safe handling

Advice on safe handling

Wear suitable protective clothing. (See section 8.)

Conditions to avoid: aerosol or mist formation

Avoid contact with skin, eyes and clothes.

Advice on protection against fire and explosion

Usual measures for fire prevention.

Advice on general occupational hygiene

When using do not eat, drink or smoke.

Further information on handling

General protection and hygiene measures: See section 8.

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep container tightly closed in a cool, well-ventilated place. Only use containers specifically approved for the substance/product.

Hints on joint storage

Do not store together with: Explosives. Oxidizing solids. Oxidizing liquids. Organic peroxides. Self-reactive substances and mixtures. Radioactive substances.. Infectious substances.

Further information on storage conditions

Recommended storage temperature: -20°C

Protect against: frost. UV-radiation/sunlight. heat. Humidity

8. Exposure controls/personal protection

Control parameters

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 4 of 10

Additional advice on limit values

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Exposure controls



Appropriate engineering controls

Technical measures and the application of suitable work processes have priority over personal protection equipment.
 Provide adequate ventilation.

Individual protection measures, such as personal protective equipment

Eye/face protection

Recommended eye protection brand: Tightly sealed safety glasses. Standards: EN 166 or 29 CFR 1910.133

Hand protection

Wear suitable gloves.

Suitable material:

FKM (fluororubber). - Thickness of the glove material 0,4 mm

Breakthrough time \geq 8 h

Butyl rubber. - Thickness of the glove material 0,5 mm

Breakthrough time \geq 8 h

CR (polychloroprenes, Chloroprene rubber). - Thickness of the glove material 0,5 mm

Breakthrough time \geq 8 h

NBR (Nitrile rubber). - Thickness of the glove material 0,35 mm

Breakthrough time \geq 8 h

PVC (Polyvinyl chloride). - Thickness of the glove material 0,5 mm

Breakthrough time \geq 8 h

For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

The selected protective gloves should satisfy the specifications of standards like EN 374.

Before using check leak tightness / impermeability. In the case of wanting to use the gloves again, clean them before taking off and air them well.

Skin protection

Suitable protective clothing: Lab apron.

Respiratory protection

With correct and proper use, and under normal conditions, breathing protection is not required.

Respiratory protection necessary at:

-Exceeding exposure limit values

-Insufficient ventilation and aerosol or mist formation

Suitable respiratory protective equipment: Particulate Respirators, Standard: 42 CFR Part 84 or DIN 143.

Type: R/N/P-95/99/100

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, self-contained breathing apparatus must be used.

Environmental exposure controls

No information available.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state:

solid

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 5 of 10

Color: white
 Odor: characteristic

Changes in the physical state

Melting point/freezing point: No information available.
 Boiling point or initial boiling point and boiling range: No information available.
 Sublimation point: No information available.
 Softening point: No information available.
 Pour point: No information available.
 Flash point: No information available.

Flammability

Solid/liquid: No information available.
 Gas: No information available.

Explosive properties

none

Lower explosion limits: No information available.
 Upper explosion limits: No information available.
 Auto-ignition temperature: No information available.

Self-ignition temperature

Solid: No information available.
 Gas: No information available.

Decomposition temperature: No information available.

pH-Value: No information available.

Viscosity / dynamic: No information available.

Viscosity / kinematic: No information available.

Flow time: No information available.

Water solubility: Immiscible

Solubility in other solvents

No information available.

Partition coefficient n-octanol/water: No information available.

Vapor pressure:
 (at 20 °C) No information available.

Vapor pressure:
 (at 50 °C) No information available.

Density (at 20 °C): No information available.

Bulk density: No information available.

Relative vapour density: No information available.

Other information

Information with regard to physical hazard classes

Sustaining combustion: No data available

Oxidizing properties
 none

Other safety characteristics

Solvent separation test: No information available.

Solvent content: No information available.

Solid content: No information available.

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 6 of 10

Evaporation rate: No information available.

Further Information

10. Stability and reactivity

Reactivity

No information available.

Chemical stability

Stability: Stable

The product is chemically stable under recommended conditions of storage, use and temperature.

Possibility of hazardous reactions

Hazardous reactions: Will not occur

Refer to chapter 10.5.

Conditions to avoid

Protect against: UV-radiation/sunlight. heat.

Incompatible materials

Materials to avoid: Oxidising agent, strong. Reducing agents, strong.

Hazardous decomposition products

No known hazardous decomposition products.

11. Toxicological information

Route(s) of Entry

Ingestion: May be harmful if swallowed. Inhalation: May be harmful if inhaled. Skin contact: Causes burns. Eye contact: Causes serious eye damage.

Information on toxicological effects

Toxicokinetics, metabolism and distribution

No information available.

Acute toxicity

Based on available data, the classification criteria are not met.

CAS No	Components				
	Exposure route	Dose	Species	Source	Method
51805-45-9	Tris(2-carboxyethyl)phosphine hydrochloride				
	oral	LD50 3500 mg/kg	Rat		
	dermal	LD50 3000 mg/kg	Rat		

Irritation and corrosivity

Causes severe skin burns and eye damage

Causes serious eye damage

Sensitizing effects

Based on available data, the classification criteria are not met.

Carcinogenic/mutagenic/toxic effects for reproduction

Based on available data, the classification criteria are not met.

Specific target organ toxicity (STOT) - single exposure

Based on available data, the classification criteria are not met.

Specific target organ toxicity (STOT) - repeated exposure

Based on available data, the classification criteria are not met.

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 7 of 10

Carcinogenicity (OSHA): Not listed.
 Carcinogenicity (IARC): Not listed.
 Carcinogenicity (NTP): Not listed.

Aspiration hazard

Based on available data, the classification criteria are not met.

Information on other hazards

Endocrine disrupting properties

No information available.

12. Ecological information

Ecotoxicity

The product has not been tested.

Persistence and degradability

The product has not been tested.

Bioaccumulative potential

No indication of bioaccumulation potential.

Mobility in soil

No information available.

Endocrine disrupting properties

This substance does not have endocrine disrupting properties with respect to non-target organisms.
 The aforementioned statement applies to substances contained in the product with a minimum content of 0.1%.

Other adverse effects

No information available.

13. Disposal considerations

Waste treatment methods

Disposal recommendations

Dispose of waste according to applicable legislation. Consult the local waste disposal expert about waste disposal.

RCRA Hazardous wastes (Resource Conservation and Recovery Act)

D002 Corrosivity

Contaminated packaging

Handle contaminated packages in the same way as the substance itself.

14. Transport information

US DOT 49 CFR 172.101

UN number or ID number:

UN 3261

Proper shipping name:

CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
 (Tris(2-carboxyethyl)phosphine hydrochloride)

Transport hazard class(es):

8

Packing group:

II

Hazard label:

8



Marine transport (IMDG)

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 8 of 10

UN number or ID number: UN 3261
UN proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
Transport hazard class(es): 8
Packing group: II
 Hazard label: 8



Special Provisions: 274
 Limited quantity: 1 kg
 Excepted quantity: E2
 EmS: F-A, S-B
 Segregation group: 1 - acids

Air transport (ICAO-TI/IATA-DGR)

UN number or ID number: UN 3261
UN proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
Transport hazard class(es): 8
Packing group: II
 Hazard label: 8



Special Provisions: A3 A803
 Limited quantity Passenger: 5 kg
 Passenger LQ: Y844
 Excepted quantity: E2
 IATA-packing instructions - Passenger: 859
 IATA-max. quantity - Passenger: 15 kg
 IATA-packing instructions - Cargo: 863
 IATA-max. quantity - Cargo: 50 kg

Environmental hazards

ENVIRONMENTALLY HAZARDOUS: No

Special precautions for user

Informations for safe handling see chapter 7.
 Informations for personal protective equipment see chapter 8.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

not relevant

15. Regulatory information

U.S. Regulations

National Inventory TSCA

All components are listed in the TSCA 8 (b) inventory as "active" or exempted.

National regulatory information

SARA Section 311/312 Hazards:

Tris(2-carboxyethyl)phosphine hydrochloride (51805-45-9): Immediate (acute) health hazard

State Regulations

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65, State of California)

This product can not expose you to chemicals known to the State of California to cause cancer, birth defects or

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 9 of 10

other reproductive harm.

This preparation is hazardous in the sense of regulation 29 CFR Part 1910.1200.

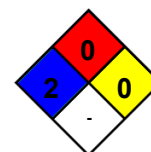
16. Other information

Hazardous Materials Information Label (HMIS)

Health: 3
 Flammability: 0
 Physical Hazard: 0
 Personal Protection: B

NFPA Hazard Ratings

Health: 2
 Flammability: 0
 Reactivity: 0
 Unique Hazard: -



Changes

Revision date: 05.12.2022
 Revision No: 1,0
 Rev. 1.00; Initial release : 05.12.2022

Abbreviations and acronyms

- ACGIH: American Conference of Governmental Industrial Hygienists
- ASTM: American Society for Testing and Materials.
- ATE: acute toxicity estimate
- BCF: Bio concentration factor
- ECHA: European Chemicals Agency
- CAS: Chemical Abstracts Service
- CFR: Code of Federal Regulations
- DOT: Department of Transportation
- d: days
- EC50: Half maximal effective concentration
- EN: European Norm
- EPA: Environmental Protection Agency
- GHS: Globally Harmonized System of Classification and Labelling of Chemicals
- h: hours
- HMIS: Hazardous Materials Identification System
- IARC: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER
- IBC: Intermediate Bulk Container
- IMDG: International Maritime Code for Dangerous Goods
- IATA: International Air Transport Association
- IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
- ICAO: International Civil Aviation Organization
- ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
- GHS: Globally Harmonized System of Classification and Labelling of Chemicals
- LOAEL: Lowest observed adverse effect level
- LOAEC: Lowest observed adverse effect concentration
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
- MARPOL: marine pollution
- NOAEL: No observed adverse effect level
- NOAEC: No observed adverse effect concentration
- NTP: National Toxicology Program
- N/A: not applicable
- NFPA: National Fire Protection Association

Safety Data Sheet

according to 29 CFR 1910.1200(g)

TCEP

Revision date: 12/05/2022

Product code: RK-PA-1_US

Page 10 of 10

UN: United Nations
OECD: Organisation for Economic Co-operation and Development
OSHA: Occupational Safety and Health Administration
PBT: Persistent bioaccumulative toxic
RTECS: Registry of Toxic Effects of Chemical Substances
REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals
SARA: Superfund Amendments and Reauthorization Act
STEL: short-term exposure limits
TSCA: Toxic Substances Control Act
TWA: time weighted average
VOC: Volatile Organic Compounds

Other data

Classification according 29 CFR Part 1910.1200: - Classification procedure:
Health hazards: Calculation method.
Environmental hazards: Calculation method.
Physical hazards: On basis of test data and / or calculated and / or estimated.

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.