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

1.1. Product identifier

Product form: Substance
Trade name: TRIS hydrochloride
EC-No.: 214-684-5
CAS-No.: 1185-53-1
Product code: T1513
Formula: C4H11NO3 · HCl
Synonyms: 2-Amino-2-(hydroxymethyl)-1,3-propanediol hydrochloride
Tris-(hydroxymethyl)-aminomethane hydrochloride
Product group: Raw material

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

1.2.1. Relevant identified uses

Main use category: Professional use
Industrial/Professional use spec: For professional use only. Duchefa Biochemie B.V. products are intended only for "in vitro laboratory" research purposes.

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Supplier
Duchefa Biochemie B.V.
A. Hofmanweg 71
2031 BH Haarlem - The Netherlands
T +31(0)23-5319093 - F +31(0)23-5318027
info@duchefa.nl

1.4. Emergency telephone number

Emergency number: Supplier contact information:
+31(0)23-5319093 (M-F 09:00-17:00)
+31(0)6-30109355 (outside office hours)

<table>
<thead>
<tr>
<th>Organisation/Company</th>
<th>Address</th>
<th>Comment</th>
</tr>
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<tbody>
<tr>
<td>World Health Organization world directory of</td>
<td><a href="http://apps.who.int/poisoncentres/">http://apps.who.int/poisoncentres/</a></td>
<td>Consult website for a local poison centre</td>
</tr>
<tr>
<td>poison centres</td>
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<td></td>
</tr>
</tbody>
</table>

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Serious eye damage/eye irritation, Category 2: H319
Skin corrosion/irritation, Category 2: H315
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation: H335

Full text of H statements: see section 16
Adverse physicochemical, human health and environmental effects
No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP):

GHS07

Signal word (CLP): Warning
Hazard statements (CLP):
H315 - Causes skin irritation.
H319 - Causes serious eye irritation.
H335 - May cause respiratory irritation.

Precautionary statements (CLP):
P280 - Wear eye protection, face protection, protective clothing, protective gloves.
P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
P305+P351 - IF IN EYES: Rinse cautiously with water for several minutes.

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name: TRIS hydrochloride
CAS-No.: 1185-53-1
EC-No.: 214-684-5

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
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<tr>
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<td></td>
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<tr>
<td></td>
<td>(EC-No.) 214-684-5</td>
<td>&gt;= 99</td>
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</tbody>
</table>

Full text of H-statements: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation: Assure fresh air breathing
Get medical advice and attention if you feel unwell.

First-aid measures after skin contact: Wash skin with plenty of water and soap
Seek medical attention if ill effect or irritation develops.

First-aid measures after eye contact: Rinse immediately with plenty of water
Seek medical advice.

First-aid measures after ingestion: Rinse mouth thoroughly with water
Seek medical attention if ill effect or irritation develops.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after skin contact: Redness, pain.
Symptoms/effects after eye contact: Redness, pain, Tears.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media: Alcohol resistant foam.
                                Dry chemical powder.
                                Carbon dioxide (CO2).
                                Water spray.

5.2. Special hazards arising from the substance or mixture
Hazardous decomposition products in case of fire:
When exposed to heat, may decompose liberating hazardous gases
- COx
- NOx.

5.3. Advice for firefighters
Protection during firefighting:
Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Measures in case of dust release:
Avoid dust formation.

6.1.2. For emergency responders
No additional information available

6.2. Environmental precautions
Prevent entry to sewers and public waters.

6.3. Methods and material for containment and cleaning up
Methods for cleaning up:
Sweep up dry powder and dispose properly.

6.4. Reference to other sections
No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling:
Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions:
Store in dry, well-ventilated area
Store at room temperature
Keep container closed when not in use.

7.3. Specific end use(s)
For professional use only. Duchefa Biochemie B.V. products are intended only for "in vitro laboratory" research purposes.
SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Additional information: Provide local exhaust or general room ventilation

8.2. Exposure controls

Hand protection:

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Permeation</th>
<th>Thickness (mm)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Nitrile rubber (NBR)</td>
<td>6 (&gt; 480 minutes)</td>
<td>0,11</td>
<td>EN 374</td>
</tr>
</tbody>
</table>

Eye protection:

Safety glasses (to European standard EN 166 or equivalent)

Skin and body protection:

Wear suitable protective clothing. Avoid repeated or prolonged skin contact

Respiratory protection:

Wear appropriate mask. Filter type P2 (EN 143)

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Solid
Appearance: Powder.
Molecular mass: 157,6 g/mol
Colour: White.
Odour: No data available
Odour threshold: No data available
pH: 3,5 - 5
Relative evaporation rate (butylacetate=1): No data available
Melting point: 150 - 152 °C
Freezing point: No data available
Boiling point: No data available
Flash point: No data available
Auto-ignition temperature: No data available
Decomposition temperature: No data available
Flammability (solid, gas): No data available
Vapour pressure: No data available
Relative vapour density at 20 °C: No data available
Relative density: No data available
Solubility: Water: ≈ 100 g/l
Log Pow: No data available
Viscosity, kinematic: No data available
Viscosity, dynamic: No data available
Explosive properties: No data available
Oxidising properties: No data available
Explosive limits: No data available
9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable under normal conditions of storage, handling and use.

10.3. Possibility of hazardous reactions
Stable under normal conditions.

10.4. Conditions to avoid
Moisture.

10.5. Incompatible materials
Strong oxidizers.

10.6. Hazardous decomposition products
According to process conditions, hazardous decomposition products may be generated.
- COx
- NOx.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified
Skin corrosion/irritation : Causes skin irritation.
  pH: 3.5 - 5
Serious eye damage/irritation : Causes serious eye irritation.
  pH: 3.5 - 5
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : May cause respiratory irritation.
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability

| TRIS hydrochloride (1185-53-1) | Product is biodegradable. |
12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment
No additional information available

12.6. Other adverse effects
Additional information: Prevent entry to sewers and public waters. Avoid release to the environment

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste treatment methods: Dispose of this material and its container at hazardous or special waste collection point. Dispose in a safe manner in accordance with local/national regulations.

SECTION 14: Transport information

In accordance with ADR / IATA / IMDG

<table>
<thead>
<tr>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
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<tbody>
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<td>14.1. UN number</td>
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<td>Not regulated</td>
</tr>
<tr>
<td>Not regulated</td>
<td>Not regulated</td>
<td>Not regulated</td>
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</tbody>
</table>
| 14.2. UN proper shipping name
  Not regulated | Not regulated | Not regulated |
| Not regulated | Not regulated | Not regulated |
| 14.3. Transport hazard class(es)
  Not regulated | Not regulated | Not regulated |
| Not regulated | Not regulated | Not regulated |
| 14.4. Packing group
  Not regulated | Not regulated | Not regulated |
| 14.5. Environmental hazards
  Not regulated | Not regulated | Not regulated |
| No supplementary information available |

14.6. Special precautions for user

- Overland transport
  Not regulated

- Transport by sea
  Not regulated

- Air transport
  Not regulated

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
  Not applicable
SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions
TRIS hydrochloride is not on the REACH Candidate List
TRIS hydrochloride is not on the REACH Annex XIV List

15.1.2. National regulations

Ensure all national/local regulations are observed.

Germany
Reference to AwSV

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV

Netherlands
SZW-lijst van kankerverwekkende stoffen
SZW-lijst van mutagene stoffen
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling

Denmark
Recommendations Danish Regulation

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Indication of changes:

<table>
<thead>
<tr>
<th>1.4</th>
<th>Emergency number</th>
<th>Modified</th>
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</thead>
<tbody>
<tr>
<td>8.2</td>
<td>Hand protection</td>
<td>Modified</td>
</tr>
</tbody>
</table>

Specified material, thickness, etcetera of gloves

Abbreviations and acronyms:

ATE  Acute Toxicity Estimate
ADR  European Agreement concerning the International Carriage of Dangerous Goods by Road
BCF  Bioconcentration factor
CLP  Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DPD  Dangerous Preparations Directive 1999/45/EC
DSD  Dangerous Substances Directive 67/548/EEC
IATA International Air Transport Association
IMDG International Maritime Dangerous Goods
LC50 Median lethal concentration
LD50 Median lethal dose
TRIS hydrochloride

Safety Data Sheet

according to Regulation (EU) 2015/830

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>NOAEC</td>
<td>No-Observed Adverse Effect Concentration</td>
</tr>
<tr>
<td>PBT</td>
<td>Persistent Bioaccumulative Toxic</td>
</tr>
<tr>
<td>SDS</td>
<td>Safety Data Sheet</td>
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</table>


Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>Eye Irrit. 2</td>
<td>Serious eye damage/eye irritation, Category 2</td>
</tr>
<tr>
<td>Skin Irrit. 2</td>
<td>Skin corrosion/irritation, Category 2</td>
</tr>
<tr>
<td>STOT SE 3</td>
<td>Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation</td>
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SDS Biochemicals version 2018

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.