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

1.1. Product identifier
Product form : Substance
Trade name : TRIS ultrapure
EC-No. : 201-064-4
CAS-No. : 77-86-1
Product code : T1501
Formula : C4H11NO3
Synonyms : Tris(hydroxymethyl)aminomethane
           Tromethamine
           Trometamol
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>
</thead>
<tbody>
<tr>
<td>World Health Organization world directory of poison centres</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>
</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
- 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 ultrapure
CAS-No.: 77-86-1
EC-No.: 201-064-4

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>TRIS ultrapure</td>
<td>(CAS-No.) 77-86-1</td>
<td>&gt; 99,9</td>
</tr>
<tr>
<td></td>
<td>(EC-No.) 201-064-4</td>
<td></td>
</tr>
</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: 121,1 g/mol
Colour: White.

Odour: No data available
Odour threshold: No data available
pH: 10,5 - 12
Relative evaporation rate (butylacetate=1): No data available

Melting point: 167 - 172 °C
Freezing point: No data available
Boiling point: 219 - 220
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
Density: 1353 g/cm³
Solubility: Water: ≈ 700 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

<table>
<thead>
<tr>
<th>TRIS ultrapure (77-86-1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>5900 mg/kg</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation : Causes skin irritation.
  pH: 10.5 - 12

Serious eye damage/irritation : Causes serious eye irritation.
  pH: 10.5 - 12

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

Other information : See actual entry in RTECS for complete information: TY2900000.

SECTION 12: Ecological information

12.1. Toxicity
No additional information available
12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>TRIS ultrapure (77-86-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
</tr>
</tbody>
</table>

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

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 ultrapure is not on the REACH Candidate List
TRIS ultrapure 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
: Water hazard class (WGK) 1, low hazard to waters (Classification according to VwVwS, Annex 3; ID No. 4650)
: Is not subject of the 12. BlmSchV (Hazardous Incident Ordinance)

Netherlands
SZW-liist van kankerverwekkende stoffen
SZW-liist 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
: The substance is not listed
: The substance is not listed
: The substance is not listed
: The substance is not listed

Denmark
Recommendations Danish Regulation
: Young people below the age of 18 years are not allowed to use the product

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>
<tr>
<td></td>
<td>Specified material, thickness, etc.</td>
<td></td>
</tr>
<tr>
<td>11.1</td>
<td>RTECS no</td>
<td>Added</td>
</tr>
</tbody>
</table>

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
TRIS ultrapure
Safety Data Sheet
according to Regulation (EU) 2015/830

IATA | International Air Transport Association
IMDG | International Maritime Dangerous Goods
LC50 | Median lethal concentration
LD50 | Median lethal dose
LOAEL | Lowest Observed Adverse Effect Level
NOAEC | No-Observed Adverse Effect Concentration
PBT | Persistent Bioaccumulative Toxic
SDS | Safety Data Sheet

Data sources: ECHA (European Chemicals Agency), Supplier.

Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>H-Statement</th>
<th>Description</th>
</tr>
</thead>
<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>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
</tbody>
</table>

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.