



SAFETY DATA SHEET

United States

Section 1. Identification

Product name

DTT Solution; part of 'First Strand cDNA Synthesis Kit, 55 reactions'

Catalogue Number

27-9261-01



9 0 2 7 9 2 6 1 0 1

Other means of identification

Not available.

Product type

Liquid.

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

Identified uses

Use in laboratories

Supplier

Cytiva
Amersham Place
Little Chalfont
Buckinghamshire
HP7 9NA United Kingdom
+44 1494 508000

Cytiva USA
100 Results Way
Marlborough, MA 01752
1-800-526-3593

In case of emergency

INFOTRAC - 24 Hour number: 1-800-535-5053

Outside of the United States, call 24 Hour number: 001-352-323-3500 (Call Collect)

Section 2. Hazards identification

OSHA/HCS status

While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture

Not classified.

Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 3%

GHS label elements

Signal word

No signal word.

Hazard statements

No known significant effects or critical hazards.

Precautionary statements

Prevention

Not applicable.

Response

Not applicable.

Storage

Not applicable.

Disposal

Not applicable.

Hazards not otherwise classified

None known.

Hazards identified when used

No known significant effects or critical hazards.



Section 3. Composition/information on ingredients

| | | | |
|---------------------------------------|---|----------|--------------------|
| Substance/mixture | Mixture | | |
| Other means of identification | Not available. | | |
| Ingredient name | Synonyms | % | Identifiers |
| (R*,R*)-1,4-dimercaptobutane-2,3-diol | 2,3-Butanediol, 1,4-dimercapto-, (2R, 3R)-rel-; 2,3-Butanediol, 1,4-dimercapto-, (R,R)-; 2,3-Butanediol, 1,4-dimercapto-, (R*, R*)-; 1,4-Dithiothreitol; (2R,3S)-1,4-disulfanylbutane-2,3-diol; dithiothreitol; 2,3-Butanediol, 1,4-dimercapto-, D-threo-; (2R,3R)-rel-1,4-Dimercapto-2,3-butanediol; 1,4-disulfanylbutane-2,3-diol; CLELANDS REAGENT; (2S,3S)-1,4-bis(sulfanyl)butane-2,3-diol | ≥1 - ≤5 | CAS: 3483-12-3 |

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

| | |
|---------------------|--|
| Eye contact | Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs. |
| Inhalation | Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur. |
| Skin contact | Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. |
| Ingestion | Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur. |

Most important symptoms/effects, acute and delayed

Potential acute health effects

| | |
|---------------------|---|
| Eye contact | No known significant effects or critical hazards. |
| Inhalation | No known significant effects or critical hazards. |
| Skin contact | No known significant effects or critical hazards. |
| Ingestion | No known significant effects or critical hazards. |

Over-exposure signs/symptoms

| | |
|---------------------|-------------------|
| Eye contact | No specific data. |
| Inhalation | No specific data. |
| Skin contact | No specific data. |
| Ingestion | No specific data. |

Indication of immediate medical attention and special treatment needed, if necessary

| | |
|-----------------------------------|---|
| Notes to physician | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| Specific treatments | No specific treatment. |
| Protection of first-aiders | No action shall be taken involving any personal risk or without suitable training. |

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

| | |
|---|---|
| Suitable extinguishing media | Use an extinguishing agent suitable for the surrounding fire. |
| Unsuitable extinguishing media | None known. |
| Specific hazards arising from the chemical | In a fire or if heated, a pressure increase will occur and the container may burst. |
| Hazardous thermal decomposition products | Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides |



| | |
|---|---|
| Special protective actions for fire-fighters | Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. |
| Special protective equipment for fire-fighters | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

| | |
|------------------------------------|---|
| For non-emergency personnel | No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment. |
| For emergency responders | If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel". |
| Environmental precautions | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). |

Methods and materials for containment and cleaning up

| | |
|--------------------|--|
| Small spill | Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor. |
| Large spill | Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Dispose of via a licensed waste disposal contractor. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. |

Section 7. Handling and storage

Precautions for safe handling

| | |
|---|--|
| Protective measures | Put on appropriate personal protective equipment (see Section 8). |
| Advice on general occupational hygiene | Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures. |
| Conditions for safe storage, including any incompatibilities | Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use. |

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

| Ingredient name | Exposure limits |
|---------------------------------------|-----------------|
| (R*,R*)-1,4-dimercaptobutane-2,3-diol | None. |

Biological exposure indices

No exposure indices known.

Appropriate engineering controls Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.



| | |
|-------------------------------|--|
| Body protection | Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. |
| Other skin protection | Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. |
| Respiratory protection | Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. |

Section 9. Physical and chemical properties

Appearance

| | | | | | | | | | | | |
|---|--|-------------------------------|------------|-----------------|-------------------------------|------------|---------------|--|--|--|--|
| Physical state | Liquid. | | | | | | | | | | |
| Color | Colorless. | | | | | | | | | | |
| Odor | Odorless. | | | | | | | | | | |
| Odor threshold | Not available. | | | | | | | | | | |
| pH | Not available. | | | | | | | | | | |
| Melting point/freezing point | Not available. | | | | | | | | | | |
| Boiling point or initial boiling point and boiling range | Not available. | | | | | | | | | | |
| Flash point | [Product does not sustain combustion.] | | | | | | | | | | |
| | | Closed cup | | Open cup | | | | | | | |
| | Ingredient name | °C | °F | Method | °C | °F | Method | | | | |
| | (R*,R*) | >110 | >230 | | | | | | | | |
| | -1,4-dimercaptobutane-2,3-diol | | | | | | | | | | |
| Burning time | Not applicable. | | | | | | | | | | |
| Burning rate | Not applicable. | | | | | | | | | | |
| Evaporation rate | Not available. | | | | | | | | | | |
| Flammability | Non-flammable in the presence of the following materials or conditions: open flames, sparks and static discharge, heat, shocks and mechanical impacts, oxidizing materials, reducing materials, combustible materials, organic materials, metals, acids, alkalis and moisture. | | | | | | | | | | |
| Lower and upper explosive (flammable) limits | Not available. | | | | | | | | | | |
| Vapor pressure | Not available. | | | | | | | | | | |
| | | Vapor Pressure at 20°C | | | Vapor pressure at 50°C | | | | | | |
| | Ingredient name | mm Hg | kPa | Method | mm Hg | kPa | Method | | | | |
| | water | 17.5 | 2.3 | | | | | | | | |
| Relative vapor density | Not available. | | | | | | | | | | |
| Relative density | Not available. | | | | | | | | | | |
| Solubility(ies) | Media | Result | | | | | | | | | |
| | cold water | Easily soluble | | | | | | | | | |
| | hot water | Easily soluble | | | | | | | | | |
| Solubility in water | Not available. | | | | | | | | | | |
| Miscible with water | Yes. | | | | | | | | | | |
| Partition coefficient: n-octanol/water | Not applicable. | | | | | | | | | | |
| Auto-ignition temperature | Not available. | | | | | | | | | | |
| Decomposition temperature | Not available. | | | | | | | | | | |
| SADT | Not available. | | | | | | | | | | |
| Viscosity | Dynamic (room temperature): Not available. Kinematic (room temperature): Not available. Kinematic (40°C (104°F)): Not available. | | | | | | | | | | |
| Flow time (ISO 2431) | Not available. | | | | | | | | | | |
| Particle characteristics | | | | | | | | | | | |
| Median particle size | Not applicable. | | | | | | | | | | |



Section 10. Stability and reactivity

| | |
|---|--|
| Reactivity | No specific test data related to reactivity available for this product or its ingredients. |
| Chemical stability | The product is stable. |
| Possibility of hazardous reactions | Under normal conditions of storage and use, hazardous reactions will not occur. |
| Conditions to avoid | No specific data. |
| Incompatible materials | No specific data. |
| Hazardous decomposition products | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

| | |
|---------------------------------------|--------------------------------|
| Product/ingredient name | Result |
| (R*,R*)-1,4-dimercaptobutane-2,3-diol | Rat - Oral - LD50 400 mg/kg |
| Conclusion/Summary [Product] | Not available. |

Skin corrosion/irritation

Not available.

| | |
|-------------------------------------|----------------|
| Conclusion/Summary [Product] | Not available. |
|-------------------------------------|----------------|

Serious eye damage/eye irritation

Not available.

| | |
|-------------------------------------|----------------|
| Conclusion/Summary [Product] | Not available. |
|-------------------------------------|----------------|

Respiratory corrosion/irritation

Not available.

| | |
|-------------------------------------|----------------|
| Conclusion/Summary [Product] | Not available. |
|-------------------------------------|----------------|

Respiratory or skin sensitization

Not available.

Skin

| | |
|-------------------------------------|----------------|
| Conclusion/Summary [Product] | Not available. |
|-------------------------------------|----------------|

Respiratory

| | |
|-------------------------------------|----------------|
| Conclusion/Summary [Product] | Not available. |
|-------------------------------------|----------------|

Germ cell mutagenicity

Not available.

| | |
|-------------------------------------|----------------|
| Conclusion/Summary [Product] | Not available. |
|-------------------------------------|----------------|

Carcinogenicity

Not available.



Conclusion/Summary [Product] Not available.

Reproductive toxicity

Not available.

Conclusion/Summary [Product] Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

Potential acute health effects

| | |
|---------------------|---|
| Eye contact | No known significant effects or critical hazards. |
| Inhalation | No known significant effects or critical hazards. |
| Skin contact | No known significant effects or critical hazards. |
| Ingestion | No known significant effects or critical hazards. |

Symptoms related to the physical, chemical and toxicological characteristics

| | |
|---------------------|-------------------|
| Eye contact | No specific data. |
| Inhalation | No specific data. |
| Skin contact | No specific data. |
| Ingestion | No specific data. |

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

| | |
|------------------------------------|----------------|
| Potential immediate effects | Not available. |
| Potential delayed effects | Not available. |

Long term exposure

| | |
|------------------------------------|----------------|
| Potential immediate effects | Not available. |
| Potential delayed effects | Not available. |

Potential chronic health effects

Not available.

Conclusion/Summary [Product] Not available.

| | |
|------------------------------|---|
| General | No known significant effects or critical hazards. |
| Carcinogenicity | No known significant effects or critical hazards. |
| Mutagenicity | No known significant effects or critical hazards. |
| Reproductive toxicity | No known significant effects or critical hazards. |

Numerical measures of toxicity

Acute toxicity estimates

| Product/ingredient name | Oral (mg/kg) | Dermal (mg/kg) | Inhalation (gases) (ppm) | Inhalation (vapors) (mg/l) | Inhalation (dusts and mists) (mg/l) |
|---|--------------|----------------|--------------------------|----------------------------|-------------------------------------|
| DTT Solution; part of 'First Strand cDNA Synthesis Kit, 55 reactions' | 13333.3 | N/A | N/A | N/A | N/A |
| (R*,R*)-1,4-dimercaptobutane-2,3-diol | 400 | N/A | N/A | N/A | N/A |



Section 12. Ecological information

Toxicity

Not available.

Conclusion/Summary [Product] Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/Water partition coefficient Not available.

Other adverse effects No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

Product is not regulated as dangerous goods for transport.

Section 15. Regulatory information

U.S. Federal regulations **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined

TSCA 12(b) - Chemical export notification

Not applicable.

| | |
|---|------------|
| Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) | Not listed |
| Clean Air Act Section 602 Class I Substances | Not listed |
| Clean Air Act Section 602 Class II Substances | Not listed |
| DEA List I Chemicals (Precursor Chemicals) | Not listed |
| DEA List II Chemicals (Essential Chemicals) | Not listed |

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ Not applicable.

SARA 311/312

Classification Not applicable.

Composition/information on ingredients

| Name | % | Classification |
|---------------------------------------|-------|--|
| (R*,R*)-1,4-dimercaptobutane-2,3-diol | 1 - 5 | ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A |

State regulations

| | |
|----------------------|------------------------------------|
| Massachusetts | None of the components are listed. |
| New York | None of the components are listed. |
| New Jersey | None of the components are listed. |
| Pennsylvania | None of the components are listed. |



California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

United States All components are active or exempted.

Canada inventory All components are listed or exempted.

Section 16. Other information**National Fire Protection Association (U.S.A.)****Procedure used to derive the classification****Classification****Justification**

Not classified.

History

Date of printing 2/19/2026

Date of issue/Date of revision 2/19/2026

Date of previous issue 10/10/2019

Version 8.01

sds_author@cytiva.com

Key to abbreviations

ATE = Acute Toxicity Estimate

BCF = Bioconcentration Factor

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

IBC = Intermediate Bulk Container

IMDG = International Maritime Dangerous Goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)

N/A = Not available

UN = United Nations

References

Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

