SAFETY DATA SHEET

Agilent Technologies

T4 DNA Ligase, Part Number 600011

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

1.1 Product identifier

Product name : T4 DNA Ligase, Part Number 600011

Part No. (Kit) : 600011

Part No. :

10 mM rATP (pH 7.5) in Sterile Water	200340-81
T4 DNA Ligase	600011-51
10x Ligase Buffer	600011-52

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

Identified uses	
Analytical reagent.	
10 mM rATP (pH 7.5) in Sterile Water	250 µl
T4 DNA Ligase	0.75 µl (300 U 4 U/µl)
10x Ligase Buffer	1 ml

1.3 Details of the supplier of the safety data sheet

Agilent Technologies Manufacturing GmbH & Co. KG
Hewlett-Packard-Str. 8
76337 Waldbronn
Germany
0800 603 1000

e-mail address of person responsible for this SDS : pdl-msds_author@agilent.com

1.4 Emergency telephone number

Emergency telephone number (with hours of operation) : CHEMTREC®: +(44)-870-8200418

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition :

10 mM rATP (pH 7.5) in Sterile Water	Mixture
T4 DNA Ligase	Mixture
10x Ligase Buffer	Mixture

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

Not classified.

Ingredients of unknown toxicity :

T4 DNA Ligase	Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 30 - 60%
10x Ligase Buffer	Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 1 - 10% Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 1 - 10% Percentage of the mixture consisting of ingredient(s) of unknown oral toxicity: 1 - 10%

Ingredients of unknown ecotoxicity : 10x Ligase Buffer — Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 7.9%

SECTION 2: Hazards identification

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Signal word	:	10 mM rATP (pH 7.5) in Sterile Water	No signal word.
		T4 DNA Ligase	No signal word.
		10x Ligase Buffer	No signal word.
Hazard statements	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.

Precautionary statements

Prevention	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.
Response	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.
Storage	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.
Disposal	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.
Hazardous ingredients	:	10x Ligase Buffer	Not applicable.
Supplemental label elements	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Safety data sheet available on request.
Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.

Special packaging requirements

Tactile warning of danger	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.

2.3 Other hazards

Other hazards which do not result in classification	:	10 mM rATP (pH 7.5) in Sterile Water	None known.
		T4 DNA Ligase	None known.
		10x Ligase Buffer	None known.

SECTION 3: Composition/information on ingredients

3.1 Substances : 10 mM rATP (pH 7.5) in Sterile Water — Mixture
T4 DNA Ligase — Mixture
10x Ligase Buffer — Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
T4 DNA Ligase Glycerol	REACH #: Annex V EC: 200-289-5 CAS: 56-81-5	≥50 - ≤75	Not classified.	[2]
10x Ligase Buffer 2-Amino-2-(hydroxymethyl) propane-1,3-diol hydrochloride	EC: 214-684-5 CAS: 1185-53-1	<10	Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 **See Section 16 for the full text of the H statements declared above.**	[1]

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

Type

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
[4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
[5] Substance of equivalent concern
[6] Additional disclosure due to company policy

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact :
10 mM rATP (pH 7.5) in Sterile Water — 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.
T4 DNA Ligase — 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.
10x Ligase Buffer — 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 :
10 mM rATP (pH 7.5) in Sterile Water — Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
T4 DNA Ligase — Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
10x Ligase Buffer — Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

SECTION 4: First aid measures

Skin contact	:	10 mM rATP (pH 7.5) in Sterile Water	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
		T4 DNA Ligase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
		10x Ligase Buffer	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion	:	10 mM rATP (pH 7.5) in Sterile Water	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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.
		T4 DNA Ligase	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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.
		10x Ligase Buffer	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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.
Protection of first-aiders	:	10 mM rATP (pH 7.5) in Sterile Water	No action shall be taken involving any personal risk or without suitable training.
		T4 DNA Ligase	No action shall be taken involving any personal risk or without suitable training.
		10x Ligase Buffer	No action shall be taken involving any personal risk or without suitable training.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Inhalation	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Skin contact	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Ingestion	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.

SECTION 4: First aid measures

Inhalation	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.
Skin contact	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.
Ingestion	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	:	10 mM rATP (pH 7.5) in Sterile Water	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		T4 DNA Ligase	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		10x Ligase Buffer	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	:	10 mM rATP (pH 7.5) in Sterile Water	No specific treatment.
		T4 DNA Ligase	No specific treatment.
		10x Ligase Buffer	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	10 mM rATP (pH 7.5) in Sterile Water	Use an extinguishing agent suitable for the surrounding fire.
		T4 DNA Ligase	Use an extinguishing agent suitable for the surrounding fire.
		10x Ligase Buffer	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	10 mM rATP (pH 7.5) in Sterile Water	None known.
		T4 DNA Ligase	None known.
		10x Ligase Buffer	None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	:	10 mM rATP (pH 7.5) in Sterile Water	In a fire or if heated, a pressure increase will occur and the container may burst.
		T4 DNA Ligase	In a fire or if heated, a pressure increase will occur and the container may burst.
		10x Ligase Buffer	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous combustion products	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
		10x Ligase Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds metal oxide/oxides

5.3 Advice for firefighters

SECTION 5: Firefighting measures

Special precautions for fire-fighters	:	10 mM rATP (pH 7.5) in Sterile Water	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.
		T4 DNA Ligase	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.
		10x Ligase Buffer	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	:	10 mM rATP (pH 7.5) in Sterile Water	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
		T4 DNA Ligase	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
		10x Ligase Buffer	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	10 mM rATP (pH 7.5) in Sterile Water	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 spilt material. Put on appropriate personal protective equipment.
		T4 DNA Ligase	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 spilt material. Put on appropriate personal protective equipment.
		10x Ligase Buffer	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 spilt material. Put on appropriate personal protective equipment.
For emergency responders	:	10 mM rATP (pH 7.5) in Sterile Water	If specialised 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".
		T4 DNA Ligase	If specialised 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".
		10x Ligase Buffer	If specialised 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".

SECTION 6: Accidental release measures

6.2 Environmental precautions

10 mM rATP (pH 7.5) in Sterile Water	Avoid dispersal of spilt 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).
T4 DNA Ligase	Avoid dispersal of spilt 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).
10x Ligase Buffer	Avoid dispersal of spilt 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).

6.3 Methods and material for containment and cleaning up

Methods for cleaning up

10 mM rATP (pH 7.5) in Sterile Water	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
T4 DNA Ligase	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
10x Ligase Buffer	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures

10 mM rATP (pH 7.5) in Sterile Water	Put on appropriate personal protective equipment (see Section 8).
T4 DNA Ligase	Put on appropriate personal protective equipment (see Section 8).
10x Ligase Buffer	Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene

10 mM rATP (pH 7.5) in Sterile Water	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.
T4 DNA Ligase	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.
10x Ligase Buffer	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 7: Handling and storage

Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Storage	:	10 mM rATP (pH 7.5) in Sterile Water	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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
		T4 DNA Ligase	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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
		10x Ligase Buffer	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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

Recommendations	:	10 mM rATP (pH 7.5) in Sterile Water	Industrial applications, Professional applications.
		T4 DNA Ligase	Industrial applications, Professional applications.
		10x Ligase Buffer	Industrial applications, Professional applications.
Industrial sector specific solutions	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
T4 DNA Ligase Glycerol	**EH40/2005 WELs (United Kingdom (UK), 12/2011).** TWA: 10 mg/m³ 8 hours. Form: Mist

SECTION 8: Exposure controls/personal protection

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

No DNELs/DMELs available.

PNECs

No PNECs available

8.2 Exposure controls

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

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.

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.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	:	10 mM rATP (pH 7.5) in Sterile Water	Liquid.
		T4 DNA Ligase	Liquid.
		10x Ligase Buffer	Liquid.
Colour	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Odour	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Odour threshold	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
pH	:	10 mM rATP (pH 7.5) in Sterile Water	7
		T4 DNA Ligase	7.5
		10x Ligase Buffer	7.5
Melting point/freezing point	:	10 mM rATP (pH 7.5) in Sterile Water	0°C
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Initial boiling point and boiling range	:	10 mM rATP (pH 7.5) in Sterile Water	100°C
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Flash point	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Evaporation rate	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Flammability (solid, gas)	:	10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
		T4 DNA Ligase	Not applicable.
		10x Ligase Buffer	Not applicable.
Upper/lower flammability or explosive limits	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Vapour pressure	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Vapour density	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.

SECTION 9: Physical and chemical properties

Relative density	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Solubility(ies)	:	10 mM rATP (pH 7.5) in Sterile Water	Easily soluble in the following materials: cold water and hot water.
		T4 DNA Ligase	Soluble in the following materials: cold water and hot water.
		10x Ligase Buffer	Easily soluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Auto-ignition temperature	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Decomposition temperature	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Viscosity	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Explosive properties	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.
Oxidising properties	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Not available.
		10x Ligase Buffer	Not available.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity	:	10 mM rATP (pH 7.5) in Sterile Water	No specific test data related to reactivity available for this product or its ingredients.
		T4 DNA Ligase	No specific test data related to reactivity available for this product or its ingredients.
		10x Ligase Buffer	No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	:	10 mM rATP (pH 7.5) in Sterile Water	The product is stable.
		T4 DNA Ligase	The product is stable.
		10x Ligase Buffer	The product is stable.
10.3 Possibility of hazardous reactions	:	10 mM rATP (pH 7.5) in Sterile Water	Under normal conditions of storage and use, hazardous reactions will not occur.
		T4 DNA Ligase	Under normal conditions of storage and use, hazardous reactions will not occur.
		10x Ligase Buffer	Under normal conditions of storage and use, hazardous reactions will not occur.

SECTION 10: Stability and reactivity

10.4 Conditions to avoid	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.
10.5 Incompatible materials	:	10 mM rATP (pH 7.5) in Sterile Water	May react or be incompatible with oxidising materials.
		T4 DNA Ligase	May react or be incompatible with oxidising materials.
		10x Ligase Buffer	May react or be incompatible with oxidising materials.
10.6 Hazardous decomposition products	:	10 mM rATP (pH 7.5) in Sterile Water	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
		T4 DNA Ligase	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
		10x Ligase Buffer	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Not available.

Acute toxicity estimates

Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
10x Ligase Buffer 2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on likely routes of exposure	:	10 mM rATP (pH 7.5) in Sterile Water	Not available.
		T4 DNA Ligase	Routes of entry anticipated: Oral, Dermal, Inhalation.
		10x Ligase Buffer	Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Inhalation	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Ingestion	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.

SECTION 11: Toxicological information

Skin contact	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Eye contact	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.
Ingestion	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.
Skin contact	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.
Eye contact	:	10 mM rATP (pH 7.5) in Sterile Water	No specific data.
		T4 DNA Ligase	No specific data.
		10x Ligase Buffer	No specific data.

Delayed and immediate effects as well as 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

General	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Carcinogenicity	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Mutagenicity	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Teratogenicity	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.

SECTION 11: Toxicological information

Developmental effects	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.
Fertility effects	:	10 mM rATP (pH 7.5) in Sterile Water	No known significant effects or critical hazards.
		T4 DNA Ligase	No known significant effects or critical hazards.
		10x Ligase Buffer	No known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Conclusion/Summary : Not available.

12.2 Persistence and degradability

Not available.

12.3 Bioaccumulative potential

Not available.

12.4 Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Mobility : Not available.

12.5 Results of PBT and vPvB assessment

PBT : Not applicable.

vPvB : Not applicable.

12.6 Other adverse effects

: No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimised 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.

Hazardous waste : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC.

Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : 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 spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

ADR/RID / IMDG / IATA : Not regulated.

14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code : Not available.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles :

10 mM rATP (pH 7.5) in Sterile Water	Not applicable.
T4 DNA Ligase	Not applicable.
10x Ligase Buffer	Not applicable.

Other EU regulations

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is not controlled under the Seveso Directive.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

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

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Europe : All components are listed or exempted.

SECTION 15: Regulatory information

Japan	:	**Japan inventory (ENCS)**: Not determined. **Japan inventory (ISHL)**: Not determined.
Malaysia	:	Not determined.
New Zealand	:	All components are listed or exempted.
Philippines	:	Not determined.
Republic of Korea	:	Not determined.
Taiwan	:	All components are listed or exempted.
Thailand	:	Not determined.
Turkey	:	Not determined.
United States	:	All components are listed or exempted.
Viet Nam	:	Not determined.

15.2 Chemical safety assessment : This product contains substances for which Chemical Safety Assessments might still be required.

SECTION 16: Other information

Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Not classified.	

Full text of abbreviated H statements

10x Ligase Buffer H315 H319 H335	 Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

Full text of classifications [CLP/GHS]

10x Ligase Buffer Eye Irrit. 2, H319 Skin Irrit. 2, H315 STOT SE 3, H335	 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2 SKIN CORROSION/IRRITATION - Category 2 SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Respiratory tract irritation) - Category 3

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