

SAFETY DATA SHEET

miRNA Labeling Kit

Section 1. Identification

Product identifier	: miRNA Labeling Kit		
Part no. (chemical kit)	: 5190-0431		
Part no.	Nuclease- Free Water		5190-0425
	DMSO		5190-0428
	10X Calf Intestinal Phosphatase Buffer		5190-0426
	Calf Intestinal Phosphatase		5190-0427
	10X T4 RNA Ligase Buffer		5190-0429
	T4 RNA Ligase		5190-0430

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

Identified uses	: Analytical reagent.		
	Nuclease- Free Water		0.45 ml
	DMSO		0.18 ml
	10X Calf Intestinal Phosphatase Buffer		0.09 ml
	Calf Intestinal Phosphatase		0.022 ml
	10X T4 RNA Ligase Buffer		0.09 ml
	T4 RNA Ligase		0.027 ml

Supplier/Manufacturer : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

Emergency telephone number (with hours of operation) : CHEMTREC®: 1-800-424-9300

Section 2. Hazard identification

Classification of the substance or mixture

DMSO

H227 FLAMMABLE LIQUIDS - Category 4

Calf Intestinal Phosphatase

H320 EYE IRRITATION - Category 2B
H412 AQUATIC HAZARD (LONG-TERM) - Category 3

T4 RNA Ligase

H320 EYE IRRITATION - Category 2B

GHS label elements

Signal word	Nuclease- Free Water	No signal word.
	DMSO	Warning
	10X Calf Intestinal Phosphatase Buffer	No signal word.
	Calf Intestinal Phosphatase	Warning
	10X T4 RNA Ligase Buffer	No signal word.
	T4 RNA Ligase	Warning

Section 2. Hazard identification

Hazard statements	<ul style="list-style-type: none"> : Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase 	<ul style="list-style-type: none"> No known significant effects or critical hazards. H227 - Combustible liquid. No known significant effects or critical hazards. H320 - Causes eye irritation. H412 - Harmful to aquatic life with long lasting effects. No known significant effects or critical hazards. H320 - Causes eye irritation.
Precautionary statements		
Prevention	<ul style="list-style-type: none"> : Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase 	<ul style="list-style-type: none"> Not applicable. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Not applicable. P273 - Avoid release to the environment. Not applicable. Not applicable.
Response	<ul style="list-style-type: none"> : Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase 	<ul style="list-style-type: none"> Not applicable. Not applicable. Not applicable. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical advice or attention. Not applicable. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical advice or attention.
Storage	<ul style="list-style-type: none"> : Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase 	<ul style="list-style-type: none"> Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.
Disposal	<ul style="list-style-type: none"> : Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase 	<ul style="list-style-type: none"> Not applicable. P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations. Not applicable. P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations. Not applicable. Not applicable.
Supplemental label elements	<ul style="list-style-type: none"> : Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase 	<ul style="list-style-type: none"> None known. None known. None known. None known. None known. None known.

Section 2. Hazard identification

	10X T4 RNA Ligase Buffer	Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 2%
Other hazards which do not result in classification	Nuclease- Free Water	None known.
	DMSO	None known.
	10X Calf Intestinal Phosphatase Buffer	None known.
	Calf Intestinal Phosphatase	None known.
	10X T4 RNA Ligase Buffer	None known.
	T4 RNA Ligase	None known.

Section 3. Composition/information on ingredients

Substance/mixture	Nuclease- Free Water	substance
	DMSO	Substance
	10X Calf Intestinal Phosphatase Buffer	Mixture
	Calf Intestinal Phosphatase	Mixture
	10X T4 RNA Ligase Buffer	Mixture
	T4 RNA Ligase	Mixture

Ingredient name	Synonyms	% (w/w)	CAS number
Nuclease- Free Water			
water	Water	100	7732-18-5
DMSO			
Dimethyl sulfoxide	DMSO	100	67-68-5
10X Calf Intestinal Phosphatase Buffer			
Magnesium chloride	Magnesium chloride	≥0.1 - ≤1	7786-30-3
Calf Intestinal Phosphatase			
Glycerol	Glycerol	≥30 - ≤60	56-81-5
Zinc chloride	Zinc Chloride	≥0.1 - ≤1	7646-85-7
10X T4 RNA Ligase Buffer			
(R*,R*)-1,4-Dimercaptobutane-2,3-diol	Dithiotreitol	≥1 - ≤5	3483-12-3
T4 RNA Ligase			
Glycerol	Glycerol	≥30 - ≤60	56-81-5

Ranges if listed above for hazardous ingredient(s) are prescribed ranges. The actual concentration(s) or actual concentration range(s) are being withheld as a trade secret.

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	: Nuclease- Free 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.
	DMSO	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 Calf Intestinal Phosphatase 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.
	Calf Intestinal Phosphatase	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. If irritation persists, get medical attention.
	10X T4 RNA 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.
	T4 RNA Ligase	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. If irritation persists, get medical attention.
Inhalation	: Nuclease- Free Water	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
	DMSO	Remove victim to fresh air and keep at rest in a position comfortable for breathing.
	10X Calf Intestinal Phosphatase 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.
	Calf Intestinal Phosphatase	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
	10X T4 RNA 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.
	T4 RNA Ligase	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained

Section 4. First-aid measures

		personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	: Nuclease- Free Water	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	DMSO	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	10X Calf Intestinal Phosphatase Buffer	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	Calf Intestinal Phosphatase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
	10X T4 RNA Ligase Buffer	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	T4 RNA Ligase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Nuclease- Free Water	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.
	DMSO	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.
	10X Calf Intestinal Phosphatase Buffer	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.
	Calf Intestinal Phosphatase	Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
	10X T4 RNA Ligase Buffer	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

Section 4. First-aid measures

T4 RNA Ligase

personnel. Get medical attention if symptoms occur. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. Causes eye irritation. No known significant effects or critical hazards. Causes eye irritation.
Inhalation	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Skin contact	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Ingestion	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No specific data. No specific data. No specific data. Adverse symptoms may include the following: irritation watering redness No specific data. Adverse symptoms may include the following:
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Section 4. First-aid measures

		irritation watering redness
Inhalation	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No specific data. No specific data. No specific data. No specific data. No specific data. No specific data. No specific data.
Skin contact	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No specific data. No specific data. No specific data. No specific data. No specific data. No specific data. No specific data.
Ingestion	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No specific data. No specific data. No specific data. No specific data. No specific data. No specific data. No specific data.

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

Notes to physician	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. 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. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. 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. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No specific treatment. No specific treatment. No specific treatment. No specific treatment. No specific treatment. No specific treatment. No specific treatment.

Section 4. First-aid measures

Protection of first-aiders	: Nuclease- Free Water	No action shall be taken involving any personal risk or without suitable training.
	DMSO	No action shall be taken involving any personal risk or without suitable training.
	10X Calf Intestinal Phosphatase Buffer	No action shall be taken involving any personal risk or without suitable training.
	Calf Intestinal Phosphatase	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	10X T4 RNA Ligase Buffer	No action shall be taken involving any personal risk or without suitable training.
	T4 RNA Ligase	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	: Nuclease- Free Water	Use an extinguishing agent suitable for the surrounding fire.
	DMSO	Use dry chemical, CO ₂ , water spray (fog) or foam.
	10X Calf Intestinal Phosphatase Buffer	Use an extinguishing agent suitable for the surrounding fire.
	Calf Intestinal Phosphatase	Use an extinguishing agent suitable for the surrounding fire.
	10X T4 RNA Ligase Buffer	Use an extinguishing agent suitable for the surrounding fire.
	T4 RNA Ligase	Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media	: Nuclease- Free Water	None known.
	DMSO	Do not use water jet.
	10X Calf Intestinal Phosphatase Buffer	None known.
	Calf Intestinal Phosphatase	None known.
	10X T4 RNA Ligase Buffer	None known.
	T4 RNA Ligase	None known.

Specific hazards arising from the chemical

:	Nuclease- Free Water	In a fire or if heated, a pressure increase will occur and the container may burst.
	DMSO	Combustible liquid. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.
	10X Calf Intestinal Phosphatase Buffer	In a fire or if heated, a pressure increase will occur and the container may burst.
	Calf Intestinal Phosphatase	In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Section 5. Fire-fighting measures

	10X T4 RNA Ligase Buffer	In a fire or if heated, a pressure increase will occur and the container may burst.
	T4 RNA Ligase	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	: Nuclease- Free Water DMSO	No specific data. Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides
	10X Calf Intestinal Phosphatase Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds
	Calf Intestinal Phosphatase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	10X T4 RNA Ligase Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides halogenated compounds metal oxide/oxides
	T4 RNA Ligase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
Special protective actions for fire-fighters	: Nuclease- Free Water DMSO	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. 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. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
	10X Calf Intestinal Phosphatase 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.
	Calf Intestinal Phosphatase	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 T4 RNA 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.
	T4 RNA 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.

Section 5. Fire-fighting measures

Special protective equipment for fire-fighters	: Nuclease- Free Water	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	DMSO	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	10X Calf Intestinal Phosphatase Buffer	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	Calf Intestinal Phosphatase	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	10X T4 RNA 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.
	T4 RNA Ligase	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	: Nuclease- Free 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 spilled material. Put on appropriate personal protective equipment.
	DMSO	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. Shut off all ignition sources. No flares, smoking or flames in hazard area. Put on appropriate personal protective equipment.
	10X Calf Intestinal Phosphatase 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 spilled material. Put on appropriate personal protective equipment.
	Calf Intestinal Phosphatase	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. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	10X T4 RNA 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 spilled material. Put on appropriate personal

Section 6. Accidental release measures

	T4 RNA Ligase	protective equipment. 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. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: Nuclease- Free Water	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".
	DMSO	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".
	10X Calf Intestinal Phosphatase Buffer	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".
	Calf Intestinal Phosphatase	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".
	10X T4 RNA Ligase Buffer	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".
	T4 RNA Ligase	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	: Nuclease- Free Water	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).
	DMSO	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).
	10X Calf Intestinal Phosphatase Buffer	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).
	Calf Intestinal Phosphatase	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). Water polluting material. May be harmful to the environment if released in large quantities.
	10X T4 RNA Ligase Buffer	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,

Section 6. Accidental release measures

T4 RNA Ligase	soil or air). 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).
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Methods and materials for containment and cleaning up

Methods for cleaning up	: Nuclease- Free 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.
	DMSO	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. 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 Calf Intestinal Phosphatase 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.
	Calf Intestinal Phosphatase	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 T4 RNA 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.
	T4 RNA 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.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	: Nuclease- Free Water	Put on appropriate personal protective equipment (see Section 8).
	DMSO	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a

Section 7. Handling and storage

		compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.
	10X Calf Intestinal Phosphatase Buffer	Put on appropriate personal protective equipment (see Section 8).
	Calf Intestinal Phosphatase	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
	10X T4 RNA Ligase Buffer	Put on appropriate personal protective equipment (see Section 8).
	T4 RNA Ligase	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene	: Nuclease- Free 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.
	DMSO	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 Calf Intestinal Phosphatase 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 8 for additional information on hygiene measures.
	Calf Intestinal Phosphatase	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 T4 RNA 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

Section 7. Handling and storage

	T4 RNA Ligase	before entering eating areas. See also Section 8 for additional information on hygiene measures. 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.
<p>Conditions for safe storage, including any incompatibilities</p>	: Nuclease- Free 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 unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	DMSO	Store in accordance with local regulations. Store in a segregated and approved area. 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. Eliminate all ignition sources. Separate from oxidizing materials. 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.
	10X Calf Intestinal Phosphatase 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 unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	Calf Intestinal Phosphatase	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.
	10X T4 RNA 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

Section 7. Handling and storage

T4 RNA Ligase

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. 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
<p>DMSO Dimethyl sulfoxide</p> <p>Calf Intestinal Phosphatase Glycerol</p> <p>Zinc chloride</p>	<p>OARS WEEL (United States, 4/2022). TWA: 250 ppm 8 hours.</p> <p>CA Alberta Provincial (Canada, 3/2023). OEL: 10 mg/m³ 8 hours. Form: Mist</p> <p>CA Quebec Provincial (Canada, 9/2023). TWA_{EV}: 10 mg/m³ 8 hours. Form: mist</p> <p>CA Saskatchewan Provincial (Canada, 4/2021). STEL: 20 mg/m³ 15 minutes. Form: mist TWA: 10 mg/m³ 8 hours. Form: mist</p> <p>CA British Columbia Provincial (Canada, 8/2023). TWA: 3 mg/m³ 8 hours. Form: respirable mist TWA: 10 mg/m³ 8 hours. Form: total mist</p> <p>CA Alberta Provincial (Canada, 3/2023). OEL: 1 mg/m³ 8 hours. Form: Fume OEL: 2 mg/m³ 15 minutes. Form: Fume</p> <p>CA British Columbia Provincial (Canada, 8/2023). TWA: 1 mg/m³ 8 hours. Form: Fume STEL: 2 mg/m³ 15 minutes. Form: Fume</p> <p>CA Ontario Provincial (Canada, 6/2019). TWA: 1 mg/m³ 8 hours. Form: Fume STEL: 2 mg/m³ 15 minutes. Form: Fume</p> <p>CA Saskatchewan Provincial (Canada, 4/2021). STEL: 2 mg/m³ 15 minutes. Form: Fume TWA: 1 mg/m³ 8 hours. Form: Fume</p> <p>CA Quebec Provincial (Canada, 9/2023).</p>

Section 8. Exposure controls/personal protection

<p>T4 RNA Ligase Glycerol</p>	<p>TWAEV: 1 mg/m³ 8 hours. Form: fume STEV: 2 mg/m³ 15 minutes. Form: fume</p> <p>CA Alberta Provincial (Canada, 3/2023). OEL: 10 mg/m³ 8 hours. Form: Mist CA Quebec Provincial (Canada, 9/2023). TWAEV: 10 mg/m³ 8 hours. Form: mist CA Saskatchewan Provincial (Canada, 4/2021). STEL: 20 mg/m³ 15 minutes. Form: mist TWA: 10 mg/m³ 8 hours. Form: mist CA British Columbia Provincial (Canada, 8/2023). TWA: 3 mg/m³ 8 hours. Form: respirable mist TWA: 10 mg/m³ 8 hours. Form: total mist</p>
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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: chemical splash goggles.
- 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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- 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.

Section 8. Exposure controls/personal protection

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 and safety characteristics

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state	Nuclease- Free Water	Liquid.
	DMSO	Liquid. [Clear.]
	10X Calf Intestinal Phosphatase Buffer	Liquid.
	Calf Intestinal Phosphatase	Liquid.
	10X T4 RNA Ligase Buffer	Liquid.
Color	T4 RNA Ligase	Liquid.
	Nuclease- Free Water	Colorless.
	DMSO	Colorless.
	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	Not available.
Odor	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.
	Nuclease- Free Water	Odorless.
	DMSO	Odorless. [Slight]
	10X Calf Intestinal Phosphatase Buffer	Not available.
Odor threshold	Calf Intestinal Phosphatase	Not available.
	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.
	Nuclease- Free Water	Not available.
	DMSO	Not available.
pH	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	Not available.
	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.
	Nuclease- Free Water	9
Melting point/freezing point	DMSO	8
	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	7.5
	10X T4 RNA Ligase Buffer	0°C (32°F)
	T4 RNA Ligase	18.5°C (65.3°F)

Section 9. Physical and chemical properties and safety characteristics

Boiling point, initial boiling point, and boiling range	Nuclease- Free Water	100°C (212°F)
	DMSO	189°C (372.2°F)
Flash point	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	Not available.
	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.
	Nuclease- Free Water	Not available.
	DMSO	Closed cup: 87°C (188.6°F) [ASTM D 93] Open cup: 87°C (188.6°F)
	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	Not available.
	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.

Ingredient name	Closed cup			Open cup		
	°C	°F	Method	°C	°F	Method
Calf Intestinal Phosphatase						
Glycerol	-	-	-	177	350.6	-
10X T4 RNA Ligase Buffer						
(R*,R*) -1,4-Dimercaptobutane-2,3-diol	>110	>230	-	-	-	-
T4 RNA Ligase						
Glycerol	-	-	-	177	350.6	-

Evaporation rate	Nuclease- Free Water	Not available.
	DMSO	0.026 (butyl acetate = 1)
	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	Not available.
	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.

Flammability	Nuclease- Free Water	Not applicable.
	DMSO	Not applicable.
	10X Calf Intestinal Phosphatase Buffer	Not applicable.
	Calf Intestinal Phosphatase	Not applicable.
	10X T4 RNA Ligase Buffer	Not applicable.
	T4 RNA Ligase	Not applicable.

Lower and upper explosion limit/flammability limit	Nuclease- Free Water	Not available.
	DMSO	Lower: 2.6% Upper: 28.5%
	10X Calf Intestinal Phosphatase Buffer	Not available.
	Calf Intestinal Phosphatase	Not available.
	10X T4 RNA Ligase Buffer	Not available.
	T4 RNA Ligase	Not available.

Section 9. Physical and chemical properties and safety characteristics

Vapor pressure : DMSO 0.056 kPa (0.42 mm Hg) [EU A.4]

Ingredient name	Vapor Pressure at 20°C			Vapor pressure at 50°C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
10X Calf Intestinal Phosphatase Buffer						
water	17.5	2.3	-	92.258	12.3	-
Calf Intestinal Phosphatase						
water	17.5	2.3	-	92.258	12.3	-
Glycerol	0.000075	0.00001	-	0.0025	0.00033	-
10X T4 RNA Ligase Buffer						
water	17.5	2.3	-	92.258	12.3	-
T4 RNA Ligase						
water	17.5	2.3	-	92.258	12.3	-
Glycerol	0.000075	0.00001	-	0.0025	0.00033	-

Relative vapor density : Nuclease- Free Water Not available.
DMSO 2.7 [Air = 1]
10X Calf Intestinal Phosphatase Buffer Not available.
Calf Intestinal Phosphatase Not available.
10X T4 RNA Ligase Buffer Not available.
T4 RNA Ligase Not available.

Relative density : Nuclease- Free Water 1
DMSO 1.1
10X Calf Intestinal Phosphatase Buffer Not available.
Calf Intestinal Phosphatase Not available.
10X T4 RNA Ligase Buffer Not available.
T4 RNA Ligase Not available.

Solubility(ies) :

Media	Result
Nuclease- Free Water	
water	Soluble
DMSO	
water	Soluble
10X Calf Intestinal Phosphatase Buffer	
water	Soluble
Calf Intestinal Phosphatase	
water	Soluble
10X T4 RNA Ligase Buffer	

Section 9. Physical and chemical properties and safety characteristics

	water	Soluble		
	T4 RNA Ligase			
	water	Soluble		
Partition coefficient: n-octanol/water	: Nuclease- Free Water	Not applicable.		
	DMSO	-1.35		
	10X Calf Intestinal Phosphatase Buffer	Not applicable.		
	Calf Intestinal Phosphatase	Not applicable.		
	10X T4 RNA Ligase Buffer	Not applicable.		
	T4 RNA Ligase	Not applicable.		
Auto-ignition temperature	: DMSO	300 to 302°C (572 to 575.6°F)		
	Ingredient name	°C	°F	Method
	Calf Intestinal Phosphatase			
	Glycerol	370	698	-
	T4 RNA Ligase			
	Glycerol	370	698	-
Decomposition temperature	: Nuclease- Free Water	>1200°C (>2192°F)		
	DMSO	140 to 189°C (284 to 372.2°F)		
	10X Calf Intestinal Phosphatase Buffer	Not available.		
	Calf Intestinal Phosphatase	Not available.		
	10X T4 RNA Ligase Buffer	Not available.		
	T4 RNA Ligase	Not available.		
Viscosity	: Nuclease- Free Water	Not available.		
	DMSO	Dynamic: 2.14 mPa·s (2.14 cP)		
	10X Calf Intestinal Phosphatase Buffer	Not available.		
	Calf Intestinal Phosphatase	Not available.		
	10X T4 RNA Ligase Buffer	Not available.		
	T4 RNA Ligase	Not available.		
Particle characteristics				
Median particle size	: Nuclease- Free Water	Not applicable.		
	DMSO	Not applicable.		
	10X Calf Intestinal Phosphatase Buffer	Not applicable.		
	Calf Intestinal Phosphatase	Not applicable.		
	10X T4 RNA Ligase Buffer	Not applicable.		
	T4 RNA Ligase	Not applicable.		

Section 10. Stability and reactivity

Reactivity	: Nuclease- Free Water	No specific test data related to reactivity available for this product or its ingredients.
	DMSO	No specific test data related to reactivity available for this product or its ingredients.
	10X Calf Intestinal Phosphatase Buffer	No specific test data related to reactivity available for this product or its ingredients.
	Calf Intestinal Phosphatase	No specific test data related to reactivity available for this product or its ingredients.
	10X T4 RNA Ligase Buffer	No specific test data related to reactivity available for this product or its ingredients.
	T4 RNA Ligase	No specific test data related to reactivity available for this product or its ingredients.

Section 10. Stability and reactivity

Chemical stability	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	The product is stable. The product is stable. The product is stable. The product is stable. The product is stable. The product is stable.
Possibility of hazardous reactions	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No specific data. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. No specific data. No specific data. No specific data. No specific data.
Incompatible materials	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	May react or be incompatible with oxidizing materials. Reactive or incompatible with the following materials: oxidizing materials May react or be incompatible with oxidizing materials. May react or be incompatible with oxidizing materials. May react or be incompatible with oxidizing materials. May react or be incompatible with oxidizing materials.
Hazardous decomposition products	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer	Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 10. Stability and reactivity

T4 RNA Ligase

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	Species	Dose	Exposure
DMSO Dimethyl sulfoxide	LD50 Dermal LD50 Oral	Rat Rat	40000 mg/kg 14500 mg/kg	- -
10X Calf Intestinal Phosphatase Buffer Magnesium chloride	LD50 Dermal LD50 Oral	Rat - Male, Female Rat	>2000 mg/kg 2800 mg/kg	- -
Calf Intestinal Phosphatase Glycerol Zinc chloride	LD50 Oral LD50 Oral	Rat Rat	12600 mg/kg 350 mg/kg	- -
T4 RNA Ligase Glycerol	LD50 Oral	Rat	12600 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
DMSO Dimethyl sulfoxide	Eyes - Mild irritant Eyes - Mild irritant	Rabbit Rabbit	- -	100 mg 24 hours 500 mg	- -
	Skin - Mild irritant Skin - Mild irritant	Rabbit Rabbit	- -	100 mg 24 hours 500 mg	- -
Calf Intestinal Phosphatase Glycerol	Eyes - Mild irritant Skin - Mild irritant	Rabbit Rabbit	- -	24 hours 500 mg 24 hours 500 mg	- -
Zinc chloride	Skin - Severe irritant	Rabbit	-	120 hours 1 %	-
T4 RNA Ligase Glycerol	Eyes - Mild irritant Skin - Mild irritant	Rabbit Rabbit	- -	24 hours 500 mg 24 hours 500 mg	- -

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Section 11. Toxicological information

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Calf Intestinal Phosphatase Zinc chloride	Category 3	-	Respiratory tract irritation
10X T4 RNA Ligase Buffer (R*,R*)-1,4-Dimercaptobutane-2,3-diol	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure	<p>Nuclease- Free Water DMSO</p> <p>10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase</p> <p>10X T4 RNA Ligase Buffer</p> <p>T4 RNA Ligase</p>	<p>Not available. Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.</p> <p>Not available.</p> <p>Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.</p> <p>Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.</p> <p>Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.</p>
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Potential acute health effects

Eye contact	<p>Nuclease- Free Water DMSO</p> <p>10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase</p> <p>10X T4 RNA Ligase Buffer T4 RNA Ligase</p>	<p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>Causes eye irritation.</p> <p>No known significant effects or critical hazards.</p> <p>Causes eye irritation.</p>
Inhalation	<p>Nuclease- Free Water DMSO</p> <p>10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase</p> <p>10X T4 RNA Ligase Buffer T4 RNA Ligase</p>	<p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p>
Skin contact	<p>Nuclease- Free Water DMSO</p> <p>10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase</p> <p>10X T4 RNA Ligase Buffer T4 RNA Ligase</p>	<p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p>

Section 11. Toxicological information

Ingestion	: Nuclease- Free Water	No known significant effects or critical hazards.
	DMSO	No known significant effects or critical hazards.
	10X Calf Intestinal Phosphatase Buffer	No known significant effects or critical hazards.
	Calf Intestinal Phosphatase	No known significant effects or critical hazards.
	10X T4 RNA Ligase Buffer	No known significant effects or critical hazards.
	T4 RNA Ligase	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Nuclease- Free Water	No specific data.
	DMSO	No specific data.
	10X Calf Intestinal Phosphatase Buffer	No specific data.
	Calf Intestinal Phosphatase	Adverse symptoms may include the following: irritation watering redness
	10X T4 RNA Ligase Buffer	No specific data.
	T4 RNA Ligase	Adverse symptoms may include the following: irritation watering redness

Inhalation	: Nuclease- Free Water	No specific data.
	DMSO	No specific data.
	10X Calf Intestinal Phosphatase Buffer	No specific data.
	Calf Intestinal Phosphatase	No specific data.
	10X T4 RNA Ligase Buffer	No specific data.
	T4 RNA Ligase	No specific data.

Skin contact	: Nuclease- Free Water	No specific data.
	DMSO	No specific data.
	10X Calf Intestinal Phosphatase Buffer	No specific data.
	Calf Intestinal Phosphatase	No specific data.
	10X T4 RNA Ligase Buffer	No specific data.
	T4 RNA Ligase	No specific data.

Ingestion	: Nuclease- Free Water	No specific data.
	DMSO	No specific data.
	10X Calf Intestinal Phosphatase Buffer	No specific data.
	Calf Intestinal Phosphatase	No specific data.
	10X T4 RNA Ligase Buffer	No specific data.
	T4 RNA Ligase	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

Section 11. Toxicological information

General	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Carcinogenicity	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Mutagenicity	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Reproductive toxicity	: Nuclease- Free Water DMSO 10X Calf Intestinal Phosphatase Buffer Calf Intestinal Phosphatase 10X T4 RNA Ligase Buffer T4 RNA Ligase	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. 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)
DMSO Dimethyl sulfoxide	14500	40000	N/A	N/A	N/A
10X Calf Intestinal Phosphatase Buffer Magnesium chloride	2800	2500	N/A	N/A	N/A
Calf Intestinal Phosphatase Glycerol Zinc chloride	12600 350	N/A N/A	N/A N/A	N/A N/A	N/A N/A
10X T4 RNA Ligase Buffer 10X T4 RNA Ligase Buffer (R*,R*)-1,4-Dimercaptobutane-2,3-diol	32467.5 500	N/A N/A	N/A N/A	N/A N/A	N/A N/A
T4 RNA Ligase Glycerol	12600	N/A	N/A	N/A	N/A

Section 11. Toxicological information

Other information	: DMSO	Adverse symptoms may include the following: kidney abnormalities
	10X T4 RNA Ligase Buffer	Adverse symptoms may include the following: May cause skin sensitization.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
DMSO Dimethyl sulfoxide	Acute LC50 25000 ppm Fresh water	Daphnia - <i>Daphnia magna</i> - Neonate	48 hours
	Acute LC50 34000000 µg/l Fresh water	Fish - <i>Pimephales promelas</i>	96 hours
	Chronic NOEC 100 µl/L Marine water	Algae - <i>Ulva lactuca</i>	72 hours
	Chronic NOEC 100 µl/L Fresh water	Daphnia - <i>Daphnia magna</i> - Juvenile (Fledgling, Hatchling, Weanling)	21 days
10X Calf Intestinal Phosphatase Buffer Magnesium chloride	Acute EC50 >100 mg/l Fresh water	Algae - <i>Desmodesmus subspicatus</i>	72 hours
	Acute EC50 180000 µg/l Fresh water	Crustaceans - <i>Eudiaptomus padanus ssp. padanus</i> - Adult	48 hours
	Acute IC50 6.8 mg/l Fresh water	Aquatic plants - <i>Lemna aequinoctialis</i>	96 hours
	Acute LC50 32000 µg/l Fresh water	Daphnia - <i>Daphnia hyalina</i> - Adult	48 hours
	Acute LC50 2120 mg/l Fresh water	Fish - <i>Pimephales promelas</i>	96 hours
	Acute NOEC 100 mg/l Fresh water	Algae - <i>Desmodesmus subspicatus</i>	72 hours
Calf Intestinal Phosphatase Glycerol Zinc chloride	Chronic NOEC 0.1 mg/l Fresh water	Fish - <i>Cyprinus carpio</i>	35 days
	Acute LC50 54000 mg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i>	96 hours
	Acute EC50 34 µg/l Fresh water	Algae - <i>Chlorella vulgaris</i> - Exponential growth phase	72 hours
	Acute EC50 26 µg/l Marine water	Algae - <i>Navicula incerta</i>	96 hours
	Acute EC50 1.8 mg/l Fresh water	Aquatic plants - <i>Lemna aequinoctialis</i>	96 hours
	Acute LC50 32 µg/l Fresh water	Crustaceans - <i>Ceriodaphnia reticulata</i>	48 hours
	Acute LC50 100 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 18 µg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i> - Fry	96 hours
	Chronic EC10 58 µg/l Fresh water	Daphnia - <i>Daphnia magna</i> - Juvenile (Fledgling, Hatchling, Weanling)	21 days
	Chronic NOEC 20 µg/l Marine water	Algae - <i>Chlorella sp.</i> - Exponential growth phase	72 hours
	Chronic NOEC 1000 µg/l Fresh water	Crustaceans - <i>Procambarus clarkii</i> - Intermolt	21 days
	Chronic NOEC 31.5 µg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i> - Juvenile (Fledgling, Hatchling, Weanling)	30 days
	10X T4 RNA Ligase Buffer (R*,R*) -1,4-Dimercaptobutane-	Acute LC50 27000 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>

Section 12. Ecological information

2,3-diol			
T4 RNA Ligase Glycerol	Acute LC50 54000 mg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i>	96 hours

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
DMSO Dimethyl sulfoxide	OECD 301D Ready Biodegradability - Closed Bottle Test	31 % - Not readily - 28 days	-	-
Calf Intestinal Phosphatase Glycerol	301D Ready Biodegradability - Closed Bottle Test	93 % - 30 days	-	-
T4 RNA Ligase Glycerol	301D Ready Biodegradability - Closed Bottle Test	93 % - 30 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Nuclease- Free Water water	-	-	Readily
DMSO Dimethyl sulfoxide	-	-	Not readily

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Nuclease- Free Water water	-1.38	-	Low
DMSO Dimethyl sulfoxide	-1.35	3.16	Low
Calf Intestinal Phosphatase Glycerol	-1.76	-	Low
Zinc chloride	-	60960	High
T4 RNA Ligase Glycerol	-1.76	-	Low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : 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. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. 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

TDG / IMDG / IATA : Not regulated.

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.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

Canadian lists

Canadian NPRI : None of the components are listed.

CEPA Toxic substances : None of the components are listed.

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

Canada : Not determined.

United States : All components are active or exempted.

Section 16. Other information

History

Date of issue/Date of revision : 09/24/2024

Date of previous issue : 08/30/2021

Version : 7

Key to abbreviations

: ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 HPR = Hazardous Products Regulations
 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

Procedure used to derive the classification

Classification	Justification
DMSO FLAMMABLE LIQUIDS - Category 4	Expert judgment
Calf Intestinal Phosphatase EYE IRRITATION - Category 2B AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method Calculation method
T4 RNA Ligase EYE IRRITATION - Category 2B	Calculation method

✔ Indicates information that has changed from previously issued version.

Notice to reader

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