SAFETY DATA SHEET

Agilent Technologies

SureGuide Cas9 Nuclease and Buffer - 100 Reactions, Part Number 5190-7717

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

1.1 Product identifier

Product name : SureGuide Cas9 Nuclease and Buffer - 100 Reactions, Part Number 5190-7717

CAS number :

RNase Free Water	7732-18-5
10X Cas9 Digestion Buffer	Not applicable.
Cas9 Nuclease	Not applicable.

Part no. (chemical kit) : 5190-7717

Part no. :

RNase Free Water	740000-42
10X Cas9 Digestion Buffer	5190-7540
Cas9 Nuclease	5190-7541

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

Identified uses : Analytical reagent.

RNase Free Water	2 x 1.5 ml
10X Cas9 Digestion Buffer	0.2 ml
Cas9 Nuclease	0.1 ml (100 reactions)

Uses advised against : None known.

1.3 Details of the supplier of the safety data sheet

Agilent Technologies Deutschland GmbH
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 :

RNase Free Water	Mono-constituent substance
10X Cas9 Digestion Buffer	Mixture
Cas9 Nuclease	Mixture

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

Cas9 Nuclease

H317	SKIN SENSITISATION	Category 1

RNase Free Water	The product is not classified as hazardous according to Regulation (EC) 1272/2008 as amended.
10X Cas9 Digestion Buffer	The product is not classified as hazardous according to Regulation (EC) 1272/2008 as amended.
Cas9 Nuclease	The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

SECTION 2: Hazards identification

Ingredients of unknown toxicity	:	10X Cas9 Digestion Buffer	Percentage of the mixture consisting of ingredient(s) of unknown acute inhalation toxicity: 10 - 30%
		Cas9 Nuclease	Percentage of the mixture consisting of ingredient(s) of unknown acute dermal toxicity: 1 - 10% Percentage of the mixture consisting of ingredient(s) of unknown acute inhalation toxicity: 30 - 60%
Ingredients of unknown ecotoxicity	:	10X Cas9 Digestion Buffer	Contains 3% of components with unknown hazards to the aquatic environment

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

Hazard pictograms : Cas9 Nuclease

Signal word	:	RNase Free Water	No signal word.
		10X Cas9 Digestion Buffer	No signal word.
		Cas9 Nuclease	Warning
Hazard statements	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	H317 - May cause an allergic skin reaction.

Precautionary statements

Prevention	:	RNase Free Water	Not applicable.
		10X Cas9 Digestion Buffer	Not applicable.
		Cas9 Nuclease	P280 - Wear protective gloves. P261 - Avoid breathing vapour.
Response	:	RNase Free Water	Not applicable.
		10X Cas9 Digestion Buffer	Not applicable.
		Cas9 Nuclease	P362 + P364 - Take off contaminated clothing and wash it before reuse. P302 + P352 - IF ON SKIN: Wash with plenty of water. P333 + P313 - If skin irritation or rash occurs: Get medical advice or attention.
Storage	:	RNase Free Water	Not applicable.
		10X Cas9 Digestion Buffer	Not applicable.
		Cas9 Nuclease	Not applicable.
Disposal	:	RNase Free Water	Not applicable.
		10X Cas9 Digestion Buffer	Not applicable.
		Cas9 Nuclease	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazardous ingredients	:	Cas9 Nuclease	2-mercaptoethanol
Supplemental label elements	:	RNase Free Water	Not applicable.
		10X Cas9 Digestion Buffer	Contains 2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated. May produce an allergic reaction. Safety data sheet available on request.
		Cas9 Nuclease	Not applicable.

SECTION 2: Hazards identification

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : RNase Free Water: Not applicable.
10X Cas9 Digestion Buffer: Not applicable.
Cas9 Nuclease: Not applicable.

Special packaging requirements

Tactile warning of danger : RNase Free Water: Not applicable.
10X Cas9 Digestion Buffer: Not applicable.
Cas9 Nuclease: Not applicable.

2.3 Other hazards

Product meets the criteria for PBT or vPvB according to Regulation (EC) No. 1907/2006, Annex XIII :

PBT	P	B	T	vPvB	vP	vB
RNase Free Water Not applicable (Inorganic)	N/A	N/A	N/A	Not applicable (Inorganic)	N/A	N/A

10X Cas9 Digestion Buffer: This mixture does not contain any substances that are assessed to be a PBT or a vPvB.
Cas9 Nuclease: This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : RNase Free Water: None known.
10X Cas9 Digestion Buffer: None known.
Cas9 Nuclease: None known.

SECTION 3: Composition/information on ingredients

3.1 Substances : RNase Free Water: Mono-constituent substance
10X Cas9 Digestion Buffer: Mixture
Cas9 Nuclease: Mixture

Product/ingredient name	Identifiers	%	Classification	Specific Conc. Limits, M-factors and ATEs	Type
RNase Free Water					
water	REACH #: Annex IV EC: 231-791-2 CAS: 7732-18-5	100	Not classified.	-	[1]
10X Cas9 Digestion Buffer					
2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	EC: 500-022-5 CAS: 9014-85-1	≤0.3	Eye Dam. 1, H318 Skin Sens. 1B, H317 Aquatic Chronic 3, H412	-	[1]
Cas9 Nuclease					
glycerol	REACH #: Annex V EC: 200-289-5 CAS: 56-81-5	≥50 - ≤75	Not classified.	-	[2]
2-mercaptoethanol	EC: 200-464-6 CAS: 60-24-2	≤0.3	Acute Tox. 3, H301 Acute Tox. 2, H310 Acute Tox. 3, H331 Skin Irrit. 2, H315	ATE [Oral] = 244 mg/kg ATE [Dermal] = 200 mg/kg	[1]

SECTION 3: Composition/information on ingredients

			Eye Dam. 1, H318 Skin Sens. 1A, H317 Repr. 2, H361f STOT RE 2, H373 (heart, liver) Aquatic Acute 1, H400 Aquatic Chronic 2, H411	ATE [Inhalation (vapours)] = 3 mg/l M [Acute] = 1	
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	CAS: 9036-19-5	<0.1	Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 **See Section 16 for the full text of the H statements declared above.**	ATE [Oral] = 500 mg/kg M [Acute] = 10 M [Chronic] = 1	[1] [3]

There are no additional ingredients present which, within the current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section.

Type

RNase Free Water	[1] Constituent
10X Cas9 Digestion Buffer	[1] Substance classified with a health or environmental hazard
Cas9 Nuclease	[1] Substance classified with a health or environmental hazard
	[2] Substance with a workplace exposure limit
	[3] Substance of equivalent concern

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

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact

: RNase 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.

10X Cas9 Digestion 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.

Cas9 Nuclease — 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. Get medical attention if irritation occurs.

Inhalation

: RNase Free Water — Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

10X Cas9 Digestion 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.

Cas9 Nuclease — 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.

SECTION 4: First aid measures

Skin contact	:	RNase Free Water	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
		10X Cas9 Digestion Buffer	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
		Cas9 Nuclease	Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	:	RNase 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.
		10X Cas9 Digestion 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.
		Cas9 Nuclease	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.
Protection of first-aiders	:	RNase Free Water	No action shall be taken involving any personal risk or without suitable training.
		10X Cas9 Digestion Buffer	No action shall be taken involving any personal risk or without suitable training.
		Cas9 Nuclease	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. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	No known significant effects or critical hazards.
Inhalation	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	No known significant effects or critical hazards.
Skin contact	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	May cause an allergic skin reaction.

SECTION 4: First aid measures

Ingestion	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	:	RNase Free Water	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	No specific data.
Inhalation	:	RNase Free Water	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	No specific data.
Skin contact	:	RNase Free Water	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: irritation redness
Ingestion	:	RNase Free Water	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	:	RNase Free Water	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		10X Cas9 Digestion 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.
		Cas9 Nuclease	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	:	RNase Free Water	No specific treatment.
		10X Cas9 Digestion Buffer	No specific treatment.
		Cas9 Nuclease	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	RNase Free Water	Use an extinguishing agent suitable for the surrounding fire.
		10X Cas9 Digestion Buffer	Use an extinguishing agent suitable for the surrounding fire.
		Cas9 Nuclease	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	RNase Free Water	None known.
		10X Cas9 Digestion Buffer	None known.
		Cas9 Nuclease	None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	:	RNase Free Water	In a fire or if heated, a pressure increase will occur and the container may burst.
		10X Cas9 Digestion Buffer	In a fire or if heated, a pressure increase will occur and the container may burst.
		Cas9 Nuclease	In a fire or if heated, a pressure increase will occur and the container may burst.

SECTION 5: Firefighting measures

Hazardous combustion products

RNase Free Water	No specific data.
10X Cas9 Digestion Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds metal oxide/oxides
Cas9 Nuclease	Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds metal oxide/oxides

5.3 Advice for firefighters

Special precautions for fire-fighters

RNase Free 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.
10X Cas9 Digestion 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.
Cas9 Nuclease	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

RNase 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. 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 Cas9 Digestion 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.
Cas9 Nuclease	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

RNase 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 spilt material. Put on appropriate personal protective equipment.
10X Cas9 Digestion 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.
Cas9 Nuclease	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. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

SECTION 6: Accidental release measures

For emergency responders	:	RNase Free 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".
		10X Cas9 Digestion 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".
		Cas9 Nuclease	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".
6.2 Environmental precautions	:	RNase Free 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).
		10X Cas9 Digestion 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).
		Cas9 Nuclease	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	:	RNase 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.
		10X Cas9 Digestion 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.
		Cas9 Nuclease	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	:	RNase Free Water	Put on appropriate personal protective equipment (see Section 8).
		10X Cas9 Digestion Buffer	Put on appropriate personal protective equipment (see Section 8).
		Cas9 Nuclease	Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour 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

SECTION 7: Handling and storage

be hazardous. Do not reuse container.

Advice on general occupational hygiene	:	RNase 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.
		10X Cas9 Digestion 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.
		Cas9 Nuclease	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.

7.2 Conditions for safe storage, including any incompatibilities

Storage	:	RNase 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
		10X Cas9 Digestion 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.
		Cas9 Nuclease	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	:	RNase Free Water	Industrial applications, Professional applications.
		10X Cas9 Digestion Buffer	Industrial applications, Professional applications.
		Cas9 Nuclease	Industrial applications, Professional applications.

SECTION 7: Handling and storage

Industrial sector specific solutions	:	RNase Free Water	Not available.
		10X Cas9 Digestion Buffer	Not available.
		Cas9 Nuclease	Not available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
Cas9 Nuclease Glycerol	**NAOSH (Ireland, 5/2021). Notes: Advisory Occupational Exposure Limit Values (OELVs)** OELV: 10 mg/m³ 8 hours. Form: mist

Biological exposure indices

No exposure indices known.

Recommended monitoring procedures : 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

Product/ingredient name	Type	Exposure	Value	Population	Effects
10X Cas9 Digestion Buffer					
2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	DNEL	Long term Oral	0.307 mg/kg bw/day	General population	Systemic
	DNEL	Long term Dermal	0.307 mg/kg bw/day	General population	Systemic
	DNEL	Long term Inhalation	0.534 mg/m³	General population	Systemic
	DNEL	Long term Dermal	0.859 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	3.03 mg/m³	Workers	Systemic
Cas9 Nuclease					
2-Mercaptoethanol	DNEL	Short term Oral	0.025 mg/kg bw/day	General population	Systemic
	DNEL	Long term Oral	0.025 mg/kg bw/day	General population	Systemic
	DNEL	Short term Dermal	0.05 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Dermal	0.05 mg/kg bw/day	Workers	Systemic
	DNEL	Short term Inhalation	0.17 mg/m³	Workers	Systemic
	DNEL	Long term Inhalation	0.17 mg/m³	Workers	Systemic

PNECs

No PNECs available

8.2 Exposure controls

SECTION 8: Exposure controls/personal protection

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

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

9.1 Information on basic physical and chemical properties

Appearance

Physical state :	RNase Free Water	Liquid.
	10X Cas9 Digestion Buffer	Liquid.
	Cas9 Nuclease	Liquid.
Colour :	RNase Free Water	Colourless.
	10X Cas9 Digestion Buffer	Not available.
	Cas9 Nuclease	Not available.
Odour :	RNase Free Water	Odourless.
	10X Cas9 Digestion Buffer	Not available.
	Cas9 Nuclease	Not available.
Odour threshold :	RNase Free Water	Not available.
	10X Cas9 Digestion Buffer	Not available.
	Cas9 Nuclease	Not available.
Melting point/freezing point :	RNase Free Water	0°C
	10X Cas9 Digestion Buffer	Not available.
	Cas9 Nuclease	Not available.

SECTION 9: Physical and chemical properties

Initial boiling point and boiling range :

RNase Free Water	100°C
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.

Flammability :

RNase Free Water	Not applicable.
10X Cas9 Digestion Buffer	Not applicable.
Cas9 Nuclease	Not applicable.

Upper/lower flammability or explosive limits :

RNase Free Water	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.

Flash point :

Ingredient name	Closed cup °C	Closed cup Method	Open cup °C	Open cup Method
Cas9 Nuclease				
glycerol	-	-	177	-

Auto-ignition temperature :

Ingredient name	°C	Method
Cas9 Nuclease		
glycerol	370	-

Decomposition temperature :

RNase Free Water	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.

pH :

RNase Free Water	7
10X Cas9 Digestion Buffer	7
Cas9 Nuclease	7

Viscosity :

RNase Free Water	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.

Solubility(ies) :

Media	Result
RNase Free Water	
water	Soluble
10X Cas9 Digestion Buffer	
water	Soluble
Cas9 Nuclease	
water	Soluble

Partition coefficient: n-octanol/water :

RNase Free Water	-1.38
10X Cas9 Digestion Buffer	Not applicable.
Cas9 Nuclease	Not applicable.

Vapour pressure :

RNase Free Water: 2.3 kPa (17.5 mm Hg) [room temperature]
12.3 kPa (92.258 mm Hg) [50°C]

Ingredient name	Vapour Pressure at 20˚C mm Hg	Vapour Pressure at 20˚C kPa	Vapour Pressure at 20˚C Method	Vapour pressure at 50˚C mm Hg	Vapour pressure at 50˚C kPa	Vapour pressure at 50˚C Method
10X Cas9 Digestion Buffer						
water	17.5	2.3	-	92.258	12.3	-
Cas9 Nuclease						

SECTION 9: Physical and chemical properties

	water	17.5	2.3	-	92.258	12.3	-
	glycerol	0.000075	0.00001	-	0.0025	0.00033	-

Evaporation rate :
- RNase Free Water: Not available.
- 10X Cas9 Digestion Buffer: Not available.
- Cas9 Nuclease: Not available.

Relative density :
- RNase Free Water: 1
- 10X Cas9 Digestion Buffer: Not available.
- Cas9 Nuclease: Not available.

Vapour density :
- RNase Free Water: 0.62 [Air = 1]
- 10X Cas9 Digestion Buffer: Not available.
- Cas9 Nuclease: Not available.

Explosive properties :
- RNase Free Water: Not available.
- 10X Cas9 Digestion Buffer: Not available.
- Cas9 Nuclease: Not available.

Oxidising properties :
- RNase Free Water: Not available.
- 10X Cas9 Digestion Buffer: Not available.
- Cas9 Nuclease: Not available.

Particle characteristics

Median particle size :
- RNase Free Water: Not applicable.
- 10X Cas9 Digestion Buffer: Not applicable.
- Cas9 Nuclease: Not applicable.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity :
- RNase Free Water: No specific test data related to reactivity available for this product or its ingredients.
- 10X Cas9 Digestion Buffer: No specific test data related to reactivity available for this product or its ingredients.
- Cas9 Nuclease: No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability :
- RNase Free Water: The product is stable.
- 10X Cas9 Digestion Buffer: The product is stable.
- Cas9 Nuclease: The product is stable.

10.3 Possibility of hazardous reactions :
- RNase Free Water: Under normal conditions of storage and use, hazardous reactions will not occur.
- 10X Cas9 Digestion Buffer: Under normal conditions of storage and use, hazardous reactions will not occur.
- Cas9 Nuclease: Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid :
- RNase Free Water: No specific data.
- 10X Cas9 Digestion Buffer: No specific data.
- Cas9 Nuclease: No specific data.

SECTION 10: Stability and reactivity

10.5 Incompatible materials

RNase Free Water	May react or be incompatible with oxidising materials.
10X Cas9 Digestion Buffer	May react or be incompatible with oxidising materials.
Cas9 Nuclease	May react or be incompatible with oxidising materials.

10.6 Hazardous decomposition products

RNase Free Water	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
10X Cas9 Digestion Buffer	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Cas9 Nuclease	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

Product/ingredient name	Result	Species	Dose	Exposure
10X Cas9 Digestion Buffer				
2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	LD50 Dermal	Rat - Male, Female	>2000 mg/kg	-
Cas9 Nuclease				
2-Mercaptoethanol	LD50 Oral	Rat	244 mg/kg	-
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	LD50 Oral	Rat	2800 mg/kg	-

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapours) (mg/l)	Inhalation (dusts and mists) (mg/l)
Cas9 Nuclease					
Cas9 Nuclease	152500.0	125000	N/A	871.1	N/A
2-Mercaptoethanol	244	200	N/A	3	N/A
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	500	N/A	N/A	N/A	N/A

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Cas9 Nuclease					
2-Mercaptoethanol	Eyes - Severe irritant	Rabbit	-	2 mg	-
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	Eyes - Severe irritant	Rabbit	-	1 %	-

Sensitiser

Conclusion/Summary : Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

SECTION 11: Toxicological information

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
Cas9 Nuclease 2-Mercaptoethanol	Category 2	-	heart, liver

Aspiration hazard

Not available.

Information on likely routes of exposure

RNase Free Water	Not available.
10X Cas9 Digestion Buffer	Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.
Cas9 Nuclease	Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

Potential acute health effects

Inhalation

RNase Free Water	No known significant effects or critical hazards.
10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
Cas9 Nuclease	No known significant effects or critical hazards.

Ingestion

RNase Free Water	No known significant effects or critical hazards.
10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
Cas9 Nuclease	No known significant effects or critical hazards.

Skin contact

RNase Free Water	No known significant effects or critical hazards.
10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
Cas9 Nuclease	May cause an allergic skin reaction.

Eye contact

RNase Free Water	No known significant effects or critical hazards.
10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
Cas9 Nuclease	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation

RNase Free Water	No specific data.
10X Cas9 Digestion Buffer	No specific data.
Cas9 Nuclease	No specific data.

Ingestion

RNase Free Water	No specific data.
10X Cas9 Digestion Buffer	No specific data.
Cas9 Nuclease	No specific data.

Skin contact

RNase Free Water	No specific data.
10X Cas9 Digestion Buffer	No specific data.
Cas9 Nuclease	Adverse symptoms may include the following: irritation redness

Eye contact

RNase Free Water	No specific data.
10X Cas9 Digestion Buffer	No specific data.
Cas9 Nuclease	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.

SECTION 11: Toxicological information

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Conclusion/Summary : Not available.

General	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	No known significant effects or critical hazards.
Mutagenicity	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	No known significant effects or critical hazards.
Reproductive toxicity	:	RNase Free Water	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	No known significant effects or critical hazards.

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

Not available.

11.2.2 Other information

Not available.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
10X Cas9 Digestion Buffer			
2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	Acute EC50 82 mg/l Fresh water	Algae - *Pseudokirchneriella subcapitata*	72 hours
	Acute EC50 91 mg/l Fresh water	Daphnia - *Daphnia magna*	48 hours
	Acute LC50 42 mg/l Fresh water	Fish - *Cyprinus carpio*	96 hours
	Acute NOEC 43 mg/l Fresh water	Daphnia - *Daphnia magna*	48 hours
	Acute NOEC 10 mg/l Fresh water	Fish - *Cyprinus carpio*	96 hours
Cas9 Nuclease			
2-Mercaptoethanol	Acute EC50 0.4 mg/l Fresh water	Daphnia	48 hours
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	Acute EC50 210 µg/l Fresh water	Algae - *Selenastrum sp.*	96 hours
	Acute LC50 10800 µg/l Marine water	Crustaceans - *Pandalus montagui* - Adult	48 hours
	Acute LC50 2.518 mg/l Fresh water	Daphnia - *Daphnia magna*	48 hours
	Acute LC50 7200 µg/l Fresh water	Fish - *Oncorhynchus mykiss*	96 hours

12.2 Persistence and degradability

SECTION 12: Ecological information

Product/ingredient name	Test	Result	Dose	Inoculum
10X Cas9 Digestion Buffer 2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	OECD 302B Inherent Biodegradability: Zahn-Wellens/ EMPA Test	6 % - Not readily - 28 days	-	-
Cas9 Nuclease 2-Mercaptoethanol	OECD 310 Ready Biodegradability - CO2 in Sealed Vessels (Headspace Test)	69 % - Not readily - 60 days	20 mg/l	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
RNase Free Water water	-	-	Readily
10X Cas9 Digestion Buffer 2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	-	-	Not readily
Cas9 Nuclease 2-Mercaptoethanol	-	-	Not readily

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
RNase Free Water water	-1.38	-	Low
10X Cas9 Digestion Buffer 2,4,7,9-Tetramethyldec-5-yne-4,7-diol, ethoxylated	1.8 to 2.5	-	Low
Cas9 Nuclease 2-Mercaptoethanol Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl) phenyl]-.omega.-hydroxy-	-0.056 2.7	- 78.67	Low Low

12.4 Mobility in soil

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

Mobility : Not available.

12.5 Results of PBT and vPvB assessment

Product/ingredient name	PBT	P	B	T	vPvB	vP	vB
RNase Free Water water	Not applicable (Inorganic)	N/A	N/A	N/A	Not applicable (Inorganic)	N/A	N/A

12.6 Endocrine disrupting properties

SECTION 12: Ecological information

Not available.

12.7 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
14.1 UN number or ID number	Not regulated.	Not regulated.	Not regulated.
14.2 UN proper shipping name	-	-	-
14.3 Transport hazard class(es)	-	-	-
14.4 Packing group	-	-	-
14.5 Environmental hazards	No.	No.	No.

Additional information

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 IMO instruments : 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

Ingredient name	Intrinsic property	Status	Reference number	Date of revision
Cas9 Nuclease Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	Endocrine disrupting properties for environment	Listed	42	7/3/2017

Substances of very high concern

Ingredient name	Intrinsic property	Status	Reference number	Date of revision
Cas9 Nuclease Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	Endocrine disrupting properties for environment	Recommended	ED/169/2012	7/3/2017

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

Product / Ingredient name	Identifiers	Designation [Usage]
Cas9 Nuclease Cas9 Nuclease		3

Label : RNase Free Water — Not applicable.
10X Cas9 Digestion Buffer — Not applicable.
Cas9 Nuclease — Not applicable.

Other EU regulations

Ozone depleting substances (1005/2009/EU)

Not listed.

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

Not listed.

Persistent Organic Pollutants

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

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 : Not determined.

SECTION 15: Regulatory information

Canada : All components are listed or exempted.

China : Not determined.

Eurasian Economic Union : **Russian Federation inventory**: All components are listed or exempted.

Japan : **Japan inventory (CSCL)**: Not determined.
Japan inventory (ISHL): Not determined.

New Zealand : Not determined.

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 active 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]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
N/A = Not available
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

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

Classification	Justification
Cas9 Nuclease Skin Sens. 1, H317	 Calculation method

Full text of abbreviated H statements

10X Cas9 Digestion Buffer	
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H412	Harmful to aquatic life with long lasting effects.
Cas9 Nuclease	
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H310	Fatal in contact with skin.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H361f	Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS]

SECTION 16: Other information

10X Cas9 Digestion Buffer	
Aquatic Chronic 3	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 3
Eye Dam. 1	SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1
Skin Sens. 1B	SKIN SENSITISATION - Category 1B
Cas9 Nuclease	
Acute Tox. 2	ACUTE TOXICITY - Category 2
Acute Tox. 3	ACUTE TOXICITY - Category 3
Acute Tox. 4	ACUTE TOXICITY - Category 4
Aquatic Acute 1	SHORT-TERM (ACUTE) AQUATIC HAZARD - Category 1
Aquatic Chronic 1	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 1
Aquatic Chronic 2	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2
Eye Dam. 1	SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1
Repr. 2	REPRODUCTIVE TOXICITY - Category 2
Skin Irrit. 2	SKIN CORROSION/IRRITATION - Category 2
Skin Sens. 1	SKIN SENSITISATION - Category 1
Skin Sens. 1A	SKIN SENSITISATION - Category 1A
STOT RE 2	SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE - Category 2

Date of issue/ Date of revision : 29/02/2024

Date of previous issue : No previous validation

Version : 1

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