Conforms to HPR 2015

SAFETY DATA SHEET

Agilent Technologies

SureGuide Cas9 Programmable Nuclease Kit - 100 Reactions, Part Number 5190-7716

Section 1. Identification

Product identifier : SureGuide Cas9 Programmable Nuclease Kit - 100 Reactions, Part Number 5190-7716

Part no. (chemical kit) : 5190-7716

Part no. :

RNase Free Water	740000-42
Control DNA Target	5190-7536
10X Cas9 Digestion Buffer	5190-7540
Cas9 Nuclease	5190-7541
Control gRNA	5190-7539

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

Identified uses : Analytical reagent.

RNase Free Water	1.5 ml
Control DNA Target	0.02 ml (20 µl 50 ng/ µl)
10X Cas9 Digestion Buffer	0.2 ml
Cas9 Nuclease	0.1 ml (100 reactions)
Control gRNA	0.01 ml (10 µl 1 µM)

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

Cas9 Nuclease

H320	EYE IRRITATION - Category 2B
H317	SKIN SENSITIZATION - Category 1A
H361	TOXIC TO REPRODUCTION - Category 2

GHS label elements

Hazard pictograms : Cas9 Nuclease

Signal word :

RNase Free Water	No signal word.
Control DNA Target	No signal word.
10X Cas9 Digestion Buffer	No signal word.
Cas9 Nuclease	Warning
Control gRNA	No signal word.

Section 2. Hazard identification

Hazard statements	: RNase Free Water	No known significant effects or critical hazards.
	Control DNA Target	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. H320 - Causes eye irritation. H361 - Suspected of damaging fertility or the unborn child.
	Control gRNA	No known significant effects or critical hazards.
Precautionary statements		
Prevention	: RNase Free Water	Not applicable.
	Control DNA Target	Not applicable.
	10X Cas9 Digestion Buffer	Not applicable.
	Cas9 Nuclease	P201 - Obtain special instructions before use. P280 - Wear protective gloves, protective clothing and eye or face protection. P261 - Avoid breathing vapor.
	Control gRNA	Not applicable.
Response	: RNase Free Water	Not applicable.
	Control DNA Target	Not applicable.
	10X Cas9 Digestion Buffer	Not applicable.
	Cas9 Nuclease	P308 + P313 - IF exposed or concerned: Get medical advice or attention. 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. 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.
	Control gRNA	Not applicable.
Storage	: RNase Free Water	Not applicable.
	Control DNA Target	Not applicable.
	10X Cas9 Digestion Buffer	Not applicable.
	Cas9 Nuclease	Not applicable.
	Control gRNA	Not applicable.
Disposal	: RNase Free Water	Not applicable.
	Control DNA Target	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.
	Control gRNA	Not applicable.
Supplemental label elements	: RNase Free Water	None known.
	Control DNA Target	None known.
	10X Cas9 Digestion Buffer	None known.
	Cas9 Nuclease	None known.
	Control gRNA	None known.
	10X Cas9 Digestion Buffer	Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 3%
Other hazards which do not result in classification	: RNase Free Water	None known.
	Control DNA Target	None known.
	10X Cas9 Digestion Buffer	None known.
	Cas9 Nuclease	None known.
	Control gRNA	None known.

Section 3. Composition/information on ingredients

Substance/mixture : RNase Free Water — Substance
Control DNA Target — Mixture
10X Cas9 Digestion Buffer — Mixture
Cas9 Nuclease — Mixture
Control gRNA — Mixture

Ingredient name	Synonyms	% (w/w)	CAS number
RNase Free Water			
water	RNase Free Water	100	7732-18-5
Cas9 Nuclease			
Glycerol	Glycerol	≥30 - ≤60	56-81-5
Potassium chloride	Potassium Chloride	≥1 - ≤5	7447-40-7
2-Mercaptoethanol	ethanol, 2-mercapto-	≥0.1 - ≤1	60-24-2
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	Polyethylene glycol octaphenyl ether	≤0.1	9036-19-5

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 : 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.

Control DNA Target — 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. If irritation persists, get medical attention.

Control gRNA — 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.

Section 4. First-aid measures

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.
		Control DNA Target	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 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.
		Control gRNA	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact	:	RNase Free Water	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
		Control DNA Target	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.
		Control gRNA	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
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.
		Control DNA Target	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.

Section 4. First-aid measures

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. 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.
Control gRNA	Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	Causes eye irritation.
		Control gRNA	No known significant effects or critical hazards.
Inhalation	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	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.
		Control gRNA	No known significant effects or critical hazards.
Skin contact	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	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.
		Control gRNA	No known significant effects or critical hazards.
Ingestion	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	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.
		Control gRNA	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	:	RNase Free Water	No specific data.
		Control DNA Target	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: irritation watering redness
		Control gRNA	No specific data.
Inhalation	:	RNase Free Water	No specific data.
		Control DNA Target	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Section 4. First-aid measures

	Control gRNA	No specific data.
Skin contact :	RNase Free Water	No specific data.
	Control DNA Target	No specific data.
	10X Cas9 Digestion Buffer	No specific data.
	Cas9 Nuclease	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
	Control gRNA	No specific data.
Ingestion :	RNase Free Water	No specific data.
	Control DNA Target	No specific data.
	10X Cas9 Digestion Buffer	No specific data.
	Cas9 Nuclease	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	Control gRNA	No specific data.

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

Notes to physician :	RNase Free Water	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	Control DNA Target	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.
	Control gRNA	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments :	RNase Free Water	No specific treatment.
	Control DNA Target	No specific treatment.
	10X Cas9 Digestion Buffer	No specific treatment.
	Cas9 Nuclease	No specific treatment.
	Control gRNA	No specific treatment.
Protection of first-aiders :	RNase Free Water	No action shall be taken involving any personal risk or without suitable training.
	Control DNA Target	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.
	Control gRNA	No action shall be taken involving any personal risk or without suitable training.

Section 4. First-aid measures

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

RNase Free Water	Use an extinguishing agent suitable for the surrounding fire.
Control DNA Target	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.
Control gRNA	Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media

RNase Free Water	None known.
Control DNA Target	None known.
10X Cas9 Digestion Buffer	None known.
Cas9 Nuclease	None known.
Control gRNA	None known.

Specific hazards arising from the chemical

RNase Free Water	In a fire or if heated, a pressure increase will occur and the container may burst.
Control DNA Target	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.
Control gRNA	In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products

RNase Free Water	No specific data.
Control DNA Target	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
Control gRNA	No specific data.

Special protective actions 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.
Control DNA Target	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

Section 5. Fire-fighting measures

		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.
	Control gRNA	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.
	Control DNA Target	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	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.
	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.
	Control gRNA	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 :	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 spilled material. Put on appropriate personal protective equipment.
	Control DNA Target	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.
	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 spilled 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 spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	Control gRNA	No action shall be taken involving any personal risk

Section 6. Accidental release measures

		or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
For emergency responders :	RNase 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".
	Control DNA Target	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 Cas9 Digestion 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".
	Cas9 Nuclease	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".
	Control gRNA	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 :	RNase 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).
	Control DNA Target	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 Cas9 Digestion 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).
	Cas9 Nuclease	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).
	Control gRNA	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Section 6. Accidental release measures

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.
		Control DNA Target	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.
		Control gRNA	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	:	RNase Free Water	Put on appropriate personal protective equipment (see Section 8).
		Control DNA Target	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. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. 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.
		Control gRNA	Put on appropriate personal protective equipment (see Section 8).

Section 7. Handling and storage

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.
	Control DNA Target	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.
	Control gRNA	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities :	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 unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	Control DNA Target	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 Cas9 Digestion Buffer	Store in accordance with local regulations. Store in original container protected from direct sunlight in a

Section 7. Handling and storage

	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.
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. Store locked up. 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.
Control gRNA	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
Cas9 Nuclease	
Glycerol	**CA Alberta Provincial (Canada, 6/2018).** OEL: 10 mg/m³ 8 hours. Form: Mist **CA Quebec Provincial (Canada, 6/2022).** TWAEV: 10 mg/m³ 8 hours. Form: mist **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 20 mg/m³ 15 minutes. Form: mist TWA: 10 mg/m³ 8 hours. Form: mist **CA British Columbia Provincial (Canada, 6/2023).** TWA: 3 mg/m³ 8 hours. Form: respirable mist TWA: 10 mg/m³ 8 hours. Form: total mist
2-Mercaptoethanol	**OARS WEEL (United States, 4/2022). Absorbed through skin.** TWA: 0.2 ppm 8 hours.

Biological exposure indices

No exposure indices known.

Section 8. Exposure controls/personal protection

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.

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 :

RNase Free Water	Liquid.
Control DNA Target	Liquid.
10X Cas9 Digestion Buffer	Liquid.
Cas9 Nuclease	Liquid.
Control gRNA	Liquid.

Color :

RNase Free Water	Colorless.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Section 9. Physical and chemical properties and safety characteristics

Odor :

RNase Free Water	Odorless.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Odor threshold :

RNase Free Water	Not available.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

pH :

RNase Free Water	7
Control DNA Target	8
10X Cas9 Digestion Buffer	7
Cas9 Nuclease	7
Control gRNA	7

Melting point/freezing point :

RNase Free Water	0°C (32°F)
Control DNA Target	0°C (32°F)
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	0°C (32°F)

Boiling point, initial boiling point, and boiling range :

RNase Free Water	100°C (212°F)
Control DNA Target	100°C (212°F)
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	100°C (212°F)

Flash point :

	Closed cup			Open cup		
Ingredient name	**°C**	**°F**	**Method**	**°C**	**°F**	**Method**
Cas9 Nuclease						
Glycerol	-	-	-	177	350.6	-

Evaporation rate :

RNase Free Water	Not available.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Flammability :

RNase Free Water	Not applicable.
Control DNA Target	Not applicable.
10X Cas9 Digestion Buffer	Not applicable.
Cas9 Nuclease	Not applicable.
Control gRNA	Not applicable.

Lower and upper explosion limit/flammability limit :

RNase Free Water	Not available.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Vapor pressure :

RNase Free Water	2.3 kPa (17.5 mm Hg) [room temperature] 12.3 kPa (92.258 mm Hg) [50°C (122°F)]

Section 9. Physical and chemical properties and safety characteristics

Ingredient name	Vapor Pressure at 20˚C			Vapor pressure at 50˚C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
Control DNA Target						
water	17.5	2.3	-	92.258	12.3	-
10X Cas9 Digestion Buffer						
water	17.5	2.3	-	92.258	12.3	-
2-Amino-2-(hydroxymethyl) propane-1,3-diol hydrochloride	0.000027	0.0000036	-	0.000007501	0.000001	-
Cas9 Nuclease						
water	17.5	2.3	-	92.258	12.3	-
Glycerol	0.000075	0.00001	-	0.0025	0.00033	-
Control gRNA						
water	17.5	2.3	-	92.258	12.3	-

Relative vapor density :

RNase Free Water	0.62 [Air = 1]
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Relative density :

RNase Free Water	1
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Solubility(ies) :

Media	Result
RNase Free Water	
water	Soluble
Control DNA Target	
water	Soluble
10X Cas9 Digestion Buffer	
water	Soluble
Cas9 Nuclease	
water	Soluble
Control gRNA	
water	Soluble

Partition coefficient: n-octanol/water :

RNase Free Water	-1.38
Control DNA Target	Not applicable.
10X Cas9 Digestion Buffer	Not applicable.
Cas9 Nuclease	Not applicable.
Control gRNA	Not applicable.

Section 9. Physical and chemical properties and safety characteristics

Auto-ignition temperature :

Ingredient name	°C	°F	Method
Cas9 Nuclease			
Glycerol	370	698	-

Decomposition temperature :

RNase Free Water	Not available.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Viscosity :

RNase Free Water	Not available.
Control DNA Target	Not available.
10X Cas9 Digestion Buffer	Not available.
Cas9 Nuclease	Not available.
Control gRNA	Not available.

Particle characteristics

Median particle size :

RNase Free Water	Not applicable.
Control DNA Target	Not applicable.
10X Cas9 Digestion Buffer	Not applicable.
Cas9 Nuclease	Not applicable.
Control gRNA	Not applicable.

Section 10. Stability and reactivity

Reactivity :

RNase Free Water	No specific test data related to reactivity available for this product or its ingredients.
Control DNA Target	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.
Control gRNA	No specific test data related to reactivity available for this product or its ingredients.

Chemical stability :

RNase Free Water	The product is stable.
Control DNA Target	The product is stable.
10X Cas9 Digestion Buffer	The product is stable.
Cas9 Nuclease	The product is stable.
Control gRNA	The product is stable.

Possibility of hazardous reactions :

RNase Free Water	Under normal conditions of storage and use, hazardous reactions will not occur.
Control DNA Target	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.
Control gRNA	Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid :

RNase Free Water	No specific data.
Control DNA Target	No specific data.
10X Cas9 Digestion Buffer	No specific data.
Cas9 Nuclease	No specific data.
Control gRNA	No specific data.

Section 10. Stability and reactivity

Incompatible materials :

RNase Free Water	May react or be incompatible with oxidizing materials.
Control DNA Target	May react or be incompatible with oxidizing materials.
10X Cas9 Digestion Buffer	May react or be incompatible with oxidizing materials.
Cas9 Nuclease	May react or be incompatible with oxidizing materials.
Control gRNA	May react or be incompatible with oxidizing materials.

Hazardous decomposition products :

RNase Free Water	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Control DNA Target	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.
Control gRNA	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
Cas9 Nuclease				
Glycerol	LD50 Oral	Rat	12600 mg/kg	-
Potassium chloride	LD50 Oral	Rat	2600 mg/kg	-
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	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Cas9 Nuclease					
Glycerol	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 mg	-
Potassium chloride	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
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 %	-

Sensitization

Not available.

Conclusion/Summary

Skin : **CAS9 Nuclease**: May cause skin sensitization.

Section 11. Toxicological information

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Cas9 Nuclease 2-Mercaptoethanol	Category 2	-	heart, liver

Aspiration hazard

Not available.

Information on the likely routes of exposure :

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

Potential acute health effects

Eye contact :

RNase Free Water	No known significant effects or critical hazards.
Control DNA Target	No known significant effects or critical hazards.
10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
Cas9 Nuclease	Causes eye irritation.
Control gRNA	No known significant effects or critical hazards.

Inhalation :

RNase Free Water	No known significant effects or critical hazards.
Control DNA Target	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.
Control gRNA	No known significant effects or critical hazards.

Skin contact :

RNase Free Water	No known significant effects or critical hazards.
Control DNA Target	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.
Control gRNA	No known significant effects or critical hazards.

Ingestion :

RNase Free Water	No known significant effects or critical hazards.
Control DNA Target	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.
Control gRNA	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Section 11. Toxicological information

Eye contact	:	RNase Free Water	No specific data.
		Control DNA Target	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: irritation watering redness
		Control gRNA	No specific data.
Inhalation	:	RNase Free Water	No specific data.
		Control DNA Target	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
		Control gRNA	No specific data.
Skin contact	:	RNase Free Water	No specific data.
		Control DNA Target	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
		Control gRNA	No specific data.
Ingestion	:	RNase Free Water	No specific data.
		Control DNA Target	No specific data.
		10X Cas9 Digestion Buffer	No specific data.
		Cas9 Nuclease	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
		Control gRNA	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

General	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	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.
		Control gRNA	No known significant effects or critical hazards.
Carcinogenicity	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	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.
		Control gRNA	No known significant effects or critical hazards.

Section 11. Toxicological information

Mutagenicity	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	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.
		Control gRNA	No known significant effects or critical hazards.
Reproductive toxicity	:	RNase Free Water	No known significant effects or critical hazards.
		Control DNA Target	No known significant effects or critical hazards.
		10X Cas9 Digestion Buffer	No known significant effects or critical hazards.
		Cas9 Nuclease	Suspected of damaging fertility or the unborn child.
		Control gRNA	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)
10X Cas9 Digestion Buffer					
10X Cas9 Digestion Buffer	150000.0	N/A	N/A	N/A	N/A
Cas9 Nuclease					
Cas9 Nuclease	73446.3	N/A	N/A	N/A	N/A
Glycerol	12600	N/A	N/A	N/A	N/A
Potassium chloride	2600	N/A	N/A	N/A	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

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Cas9 Nuclease			
Glycerol	Acute LC50 54000 mg/l Fresh water	Fish - *Oncorhynchus mykiss*	96 hours
Potassium chloride	Acute EC50 9.24 g/L Fresh water	Algae - *Desmodesmus subspicatus*	72 hours
	Acute EC50 1337000 µg/l Fresh water	Algae - *Navicula seminulum*	96 hours
	Acute LC50 9.68 mg/l Fresh water	Crustaceans - *Pseudosida ramosa* - Neonate	48 hours
	Acute LC50 93000 µg/l Fresh water	Daphnia - *Daphnia magna*	48 hours
	Acute LC50 509.65 mg/l Fresh water	Fish - *Danio rerio*	96 hours
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

Persistence and degradability

Section 12. Ecological information

Product/ingredient name	Test	Result	Dose	Inoculum
Cas9 Nuclease				
Glycerol	301D Ready Biodegradability - Closed Bottle Test	93 % - 30 days	-	-
2-Mercaptoethanol	OECD 310 Ready Biodegradability - CO_2 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
Cas9 Nuclease			
Potassium chloride	-	-	Readily
2-Mercaptoethanol	-	-	Not readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
RNase Free Water			
water	-1.38	-	Low
Cas9 Nuclease			
Glycerol	-1.76	-	Low
Potassium chloride	-0.46	-	Low
2-Mercaptoethanol	-0.056	-	Low
Poly(oxy-1,2-ethanediyl), . alpha.-[(1,1,3,3-tetramethylbutyl) phenyl]-.omega.-hydroxy-	2.7	78.67	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 : 02/07/2024

Date of previous issue : 02/26/2021

Version : 6

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

Section 16. Other information

Classification	Justification
Cas9 Nuclease	
EYE IRRITATION - Category 2B	Calculation method
SKIN SENSITIZATION - Category 1A	Calculation method
TOXIC TO REPRODUCTION - Category 2	Calculation method

Indicates information that has changed from previously issued version.

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