Conforms to US OSHA Hazard Communication 29CFR1910.1200

SAFETY DATA SHEET

Agilent Technologies

Herculase II Fusion DNA Polymerase, Part Number 600675

Section 1. Identification

1.1 Product identifier

Product name : Herculase II Fusion DNA Polymerase, Part Number 600675

Part no. (chemical kit) : 600675

Part no. :

DMSO	600260-53
Herculase II Fusion DNA Polymerase	600675-51
5X Herculase II Reaction Buffer	600675-52

Validation date : 7/4/2022

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

Material uses : Analytical reagent.

DMSO	1 ml
5X Herculase II Reaction Buffer	1.5 ml
Herculase II Fusion DNA Polymerase	0.04 ml (40 reactions)

1.3 Details of the supplier of the safety data sheet

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

1.4 Emergency telephone number

In case of emergency : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status :

DMSO	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Herculase II Fusion DNA Polymerase	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
5X Herculase II Reaction Buffer	While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture

DMSO

H227	FLAMMABLE LIQUIDS - Category 4
H320	EYE IRRITATION - Category 2B

Herculase II Fusion DNA Polymerase

H320	EYE IRRITATION - Category 2B

2.2 GHS label elements

Signal word :

DMSO	Warning
Herculase II Fusion DNA Polymerase	Warning
5X Herculase II Reaction Buffer	No signal word.

Section 2. Hazards identification

Hazard statements	:	DMSO	H227 - Combustible liquid. H320 - Causes eye irritation.
		Herculase II Fusion DNA Polymerase	H320 - Causes eye irritation.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Precautionary statements			
Prevention	:	DMSO	P210 - Keep away from flames and hot surfaces. No smoking.
		Herculase II Fusion DNA Polymerase	Not applicable.
		5X Herculase II Reaction Buffer	Not applicable.
Response	:	DMSO	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.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction Buffer	Not applicable.
Storage	:	DMSO	P403 + P235 - Store in a well-ventilated place. Keep cool.
		Herculase II Fusion DNA Polymerase	Not applicable.
		5X Herculase II Reaction Buffer	Not applicable.
Disposal	:	DMSO	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
		Herculase II Fusion DNA Polymerase	Not applicable.
		5X Herculase II Reaction Buffer	Not applicable.
Supplemental label elements	:	DMSO	None known.
		Herculase II Fusion DNA Polymerase	None known.
		5X Herculase II Reaction Buffer	None known.
2.3 Other hazards			
Hazards not otherwise classified	:	DMSO	None known.
		Herculase II Fusion DNA Polymerase	None known.
		5X Herculase II Reaction Buffer	None known.

Section 3. Composition/information on ingredients

Substance/mixture	:	DMSO	Substance
		Herculase II Fusion DNA Polymerase	Mixture
		5X Herculase II Reaction Buffer	Mixture

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
DMSO		
Dimethyl sulfoxide	100	67-68-5
Herculase II Fusion DNA Polymerase		
Glycerol	≥50 - ≤75	56-81-5
5X Herculase II Reaction Buffer		
Trometamol	≤3	77-86-1
Ammonium sulphate	≤3	7783-20-2
Hexadecan-1-ol, ethoxylated	<2.5	9004-95-9

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

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

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

Section 4. First aid measures

4.1 Description of necessary first aid measures

Eye contact :

DMSO: 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.

Herculase II Fusion DNA Polymerase: 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.

5X Herculase II Reaction Buffer: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation :

DMSO: 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.

Herculase II Fusion DNA Polymerase: 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.

5X Herculase II Reaction Buffer: Remove victim to fresh air and keep at rest in a

Section 4. First aid measures

			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.
Skin contact	:	DMSO	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		Herculase II Fusion DNA Polymerase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		5X Herculase II Reaction Buffer	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion	:	DMSO	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.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction 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.

4.2 Most important symptoms/effects, acute and delayed

Potential acute health effects

Section 4. First aid measures

Eye contact	:	DMSO	Causes eye irritation.
		Herculase II Fusion DNA Polymerase	Causes eye irritation.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Inhalation	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Skin contact	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Ingestion	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	:	DMSO	Adverse symptoms may include the following: irritation watering redness
		Herculase II Fusion DNA Polymerase	Adverse symptoms may include the following: irritation watering redness
		5X Herculase II Reaction Buffer	No specific data.
Inhalation	:	DMSO	No specific data.
		Herculase II Fusion DNA Polymerase	No specific data.
		5X Herculase II Reaction Buffer	No specific data.
Skin contact	:	DMSO	No specific data.
		Herculase II Fusion DNA Polymerase	No specific data.
		5X Herculase II Reaction Buffer	No specific data.
Ingestion	:	DMSO	No specific data.
		Herculase II Fusion DNA Polymerase	No specific data.
		5X Herculase II Reaction Buffer	No specific data.

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

Notes to physician	:	DMSO	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		Herculase II Fusion DNA Polymerase	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		5X Herculase II Reaction Buffer	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	:	DMSO	No specific treatment.
		Herculase II Fusion DNA Polymerase	No specific treatment.
		5X Herculase II Reaction Buffer	No specific treatment.

Section 4. First aid measures

Protection of first-aiders	:	DMSO	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.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction Buffer	No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	DMSO	Use dry chemical, CO_2, water spray (fog) or foam.
		Herculase II Fusion DNA Polymerase	Use an extinguishing agent suitable for the surrounding fire.
		5X Herculase II Reaction Buffer	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	DMSO	Do not use water jet.
		Herculase II Fusion DNA Polymerase	None known.
		5X Herculase II Reaction Buffer	None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards arising from the chemical	:	DMSO	Combustible liquid. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.
		Herculase II Fusion DNA Polymerase	In a fire or if heated, a pressure increase will occur and the container may burst.
		5X Herculase II Reaction Buffer	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	:	DMSO	Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides
		Herculase II Fusion DNA Polymerase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
		5X Herculase II Reaction Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides metal oxide/oxides

5.3 Advice for firefighters

Section 5. Fire-fighting measures

Special protective actions for fire-fighters	:	DMSO	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction Buffer	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	DMSO	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		Herculase II Fusion DNA Polymerase	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		5X Herculase II Reaction Buffer	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

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	DMSO	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction 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.

Section 6. Accidental release measures

For emergency responders	:	DMSO	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
		Herculase II Fusion DNA Polymerase	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".
		5X Herculase II Reaction 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".
6.2 Environmental precautions	:	DMSO	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
		Herculase II Fusion DNA Polymerase	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).
		5X Herculase II Reaction 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).

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up	:	DMSO	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction 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.

Section 7. Handling and storage

7.1 Precautions for safe handling

Section 7. Handling and storage

Protective measures	:	DMSO	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.
		Herculase II Fusion DNA Polymerase	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
		5X Herculase II Reaction Buffer	Put on appropriate personal protective equipment (see Section 8).
Advice on general occupational hygiene	:	DMSO	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
		Herculase II Fusion DNA Polymerase	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.
		5X Herculase II Reaction 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.
7.2 Conditions for safe storage, including any incompatibilities	:	DMSO	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate

Section 7. Handling and storage

	containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
Herculase II Fusion DNA Polymerase	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.
5X Herculase II Reaction Buffer	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

Recommendations	:	DMSO	Industrial applications, Professional applications.
		Herculase II Fusion DNA Polymerase	Industrial applications, Professional applications.
		5X Herculase II Reaction Buffer	Industrial applications, Professional applications.
Industrial sector specific solutions	:	DMSO	Not available.
		Herculase II Fusion DNA Polymerase	Not available.
		5X Herculase II Reaction Buffer	Not available.

Section 8. Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
DMSO Dimethyl sulfoxide	**OARS WEEL (United States, 1/2021).** TWA: 250 ppm 8 hours.
Herculase II Fusion DNA Polymerase Glycerol	**OSHA PEL 1989 (United States, 3/1989).** TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 10 mg/m³ 8 hours. Form: Total dust **OSHA PEL (United States, 5/2018).** TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust
5X Herculase II Reaction Buffer Trometamol	None.

Section 8. Exposure controls/personal protection

Ammonium sulphate	None.
Hexadecan-1-ol, ethoxylated	None.

8.2 Exposure controls

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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 :	DMSO	Liquid. [Clear.]
	Herculase II Fusion DNA Polymerase	Liquid.
	5X Herculase II Reaction Buffer	Liquid.
Color :	DMSO	Colorless.
	Herculase II Fusion DNA Polymerase	Not available.
	5X Herculase II Reaction Buffer	Not available.

Section 9. Physical and chemical properties and safety characteristics

Odor :
DMSO — Odorless. [Slight]
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Odor threshold :
DMSO — Not available.
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

pH :
DMSO — Not available.
Herculase II Fusion DNA Polymerase — 8.2
5X Herculase II Reaction Buffer — 9.5 to 10.5

Melting point/freezing point :
DMSO — 18.5°C (65.3°F)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Boiling point, initial boiling point, and boiling range :
DMSO — 189°C (372.2°F)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Flash point :
DMSO — Closed cup: 87°C (188.6°F) [ASTM D 93]
Open cup: 87°C (188.6°F)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Ingredient name	Closed cup °C	Closed cup °F	Closed cup Method	Open cup °C	Open cup °F	Open cup Method
Herculase II Fusion DNA Polymerase						
Edetic acid	>100	>212	DIN 51758			
(R*,R*) -1,4-Dimercaptobutane-2,3-diol	>110	>230				

Evaporation rate :
DMSO — 0.026 (butyl acetate = 1)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Flammability :
DMSO — Not applicable.
Herculase II Fusion DNA Polymerase — Not applicable.
5X Herculase II Reaction Buffer — Not applicable.

Lower and upper explosion limit/flammability limit :
DMSO — Lower: 2.6%
Upper: 28.5%
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Vapor pressure :
DMSO — 0.056 kPa (0.42 mm Hg) [EU A.4]
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

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
Herculase II Fusion DNA Polymerase						
water	23.8	3.2		92.258	12.3	
Glycerol	0.000075	0.00001		0.0025	0.00033	
5X Herculase II Reaction Buffer						
water	23.8	3.2		92.258	12.3	
Sulfuric acid, magnesium salt, hydrate (1:1:7)	<0.1	<0.013				

Relative vapor density :
DMSO — 2.7 [Air = 1]
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Relative density :
DMSO — 1.1
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Solubility :
DMSO — Easily soluble in the following materials: cold water and hot water.
Herculase II Fusion DNA Polymerase — Soluble in the following materials: cold water and hot water.
5X Herculase II Reaction Buffer — Easily soluble in the following materials: cold water and hot water.

Partition coefficient: n-octanol/water :
DMSO — -1.35
Herculase II Fusion DNA Polymerase — Not applicable.
5X Herculase II Reaction Buffer — Not applicable.

Auto-ignition temperature :
DMSO — 300 to 302°C (572 to 575.6°F)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Ingredient name	°C	°F	Method
Herculase II Fusion DNA Polymerase			
Glycerol	370	698	
Edetic acid	>400	>752	VDI 2263

Decomposition temperature :
DMSO — 140 to 189°C (284 to 372.2°F)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Viscosity :
DMSO — Dynamic: 2.14 mPa·s (2.14 cP)
Herculase II Fusion DNA Polymerase — Not available.
5X Herculase II Reaction Buffer — Not available.

Particle characteristics

Median particle size :
DMSO — Not applicable.
Herculase II Fusion DNA Polymerase — Not applicable.
5X Herculase II Reaction Buffer — Not applicable.

Section 10. Stability and reactivity

10.1 Reactivity	: DMSO	No specific test data related to reactivity available for this product or its ingredients.
	Herculase II Fusion DNA Polymerase	No specific test data related to reactivity available for this product or its ingredients.
	5X Herculase II Reaction Buffer	No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	: DMSO	The product is stable.
	Herculase II Fusion DNA Polymerase	The product is stable.
	5X Herculase II Reaction Buffer	The product is stable.
10.3 Possibility of hazardous reactions	: DMSO	Under normal conditions of storage and use, hazardous reactions will not occur.
	Herculase II Fusion DNA Polymerase	Under normal conditions of storage and use, hazardous reactions will not occur.
	5X Herculase II Reaction Buffer	Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	: DMSO	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
	Herculase II Fusion DNA Polymerase	No specific data.
	5X Herculase II Reaction Buffer	No specific data.
10.5 Incompatible materials	: DMSO	Reactive or incompatible with the following materials: oxidizing materials
	Herculase II Fusion DNA Polymerase	May react or be incompatible with oxidizing materials.
	5X Herculase II Reaction Buffer	May react or be incompatible with oxidizing materials.
10.6 Hazardous decomposition products	: DMSO	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	Herculase II Fusion DNA Polymerase	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	5X Herculase II Reaction Buffer	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Section 11. Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
DMSO				
Dimethyl sulfoxide	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
Herculase II Fusion DNA Polymerase				
Glycerol	LD50 Oral	Rat	12600 mg/kg	-
5X Herculase II Reaction Buffer				
Trometamol	LD50 Dermal	Rat	>5000 mg/kg	-
Ammonium sulphate	LD50 Oral	Rat	2840 mg/kg	-
Hexadecan-1-ol, ethoxylated	LD50 Oral	Rat	2500 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
DMSO					
Dimethyl sulfoxide	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Eyes - Mild irritant	Rabbit	-	100 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Mild irritant	Rabbit	-	100 mg	-
Herculase II Fusion DNA Polymerase					
Glycerol	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 mg	-
5X Herculase II Reaction Buffer					
Trometamol	Skin - Moderate irritant	Rabbit	-	25 %	-
	Skin - Severe irritant	Rabbit	-	500 mg	-

Sensitization

Not available.

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)

Name	Category	Route of exposure	Target organs
5X Herculase II Reaction Buffer			
Trometamol	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Section 11. Toxicological information

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure	:	DMSO	Routes of entry anticipated: Oral, Dermal, Inhalation.
		Herculase II Fusion DNA Polymerase	Routes of entry anticipated: Oral, Dermal, Inhalation.
		5X Herculase II Reaction Buffer	Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact	:	DMSO	Causes eye irritation.
		Herculase II Fusion DNA Polymerase	Causes eye irritation.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Inhalation	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Skin contact	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Ingestion	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	:	DMSO	Adverse symptoms may include the following: irritation watering redness
		Herculase II Fusion DNA Polymerase	Adverse symptoms may include the following: irritation watering redness
		5X Herculase II Reaction Buffer	No specific data.
Inhalation	:	DMSO	No specific data.
		Herculase II Fusion DNA Polymerase	No specific data.
		5X Herculase II Reaction Buffer	No specific data.
Skin contact	:	DMSO	No specific data.
		Herculase II Fusion DNA Polymerase	No specific data.
		5X Herculase II Reaction Buffer	No specific data.
Ingestion	:	DMSO	No specific data.
		Herculase II Fusion DNA Polymerase	No specific data.
		5X Herculase II Reaction Buffer	No specific data.

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

Short term exposure

Section 11. Toxicological information

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	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Carcinogenicity	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Mutagenicity	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.
Reproductive toxicity	:	DMSO	No known significant effects or critical hazards.
		Herculase II Fusion DNA Polymerase	No known significant effects or critical hazards.
		5X Herculase II Reaction Buffer	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
DMSO					
Dimethyl sulfoxide	14500	40000	N/A	N/A	N/A
Herculase II Fusion DNA Polymerase					
Glycerol	12600	N/A	N/A	N/A	N/A
5X Herculase II Reaction Buffer					
5X Herculase II Reaction Buffer	107739	N/A	N/A	N/A	N/A
Ammonium sulphate	2840	N/A	N/A	N/A	N/A
Hexadecan-1-ol, ethoxylated	2500	N/A	N/A	N/A	N/A

Section 12. Ecological information

12.1 Toxicity

Section 12. Ecological information

Product/ingredient name	Result	Species	Exposure
DMSO			
Dimethyl sulfoxide	Acute LC50 25000 ppm Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 34000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 100 ul/L Marine water	Algae - Ulva lactuca	72 hours
	Chronic NOEC 100 ul/L Fresh water	Daphnia - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling)	21 days
Herculase II Fusion DNA Polymerase			
Glycerol	Acute LC50 54000 mg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
5X Herculase II Reaction Buffer			
Trometamol	Acute EC50 >980 mg/l Fresh water	Daphnia	48 hours
	Acute NOEC 520 mg/l Fresh water	Daphnia	48 hours
Ammonium sulphate	Chronic NOEC 7.5 mg/l Marine water	Algae - Phaeodactylum tricornutum - Exponential growth phase	96 hours
Hexadecan-1-ol, ethoxylated	Acute LC50 330000 to 1000000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
DMSO				
Dimethyl sulfoxide	OECD 301D Ready Biodegradability - Closed Bottle Test	31 % - Not readily - 28 days	-	-
Herculase II Fusion DNA Polymerase				
Glycerol	301D Ready Biodegradability - Closed Bottle Test	93 % - 30 days	-	-
5X Herculase II Reaction Buffer				
Trometamol	OECD 301F Ready Biodegradability - Manometric Respirometry Test	97.1 % - Readily - 28 days	30 mg/l	-

Section 12. Ecological information

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
DMSO			
Dimethyl sulfoxide	-	-	Not readily
5X Herculase II Reaction Buffer			
Trometamol	-	-	Readily
Ammonium sulphate	-	-	Readily
Hexadecan-1-ol, ethoxylated	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
DMSO			
Dimethyl sulfoxide	-1.35	3.16	low
Herculase II Fusion DNA Polymerase			
Glycerol	-1.76	-	low
5X Herculase II Reaction Buffer			
Trometamol	-2.31	-	low
Ammonium sulphate	-5.1	-	low

12.4 Mobility in soil

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

12.5 Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

13.1 Waste treatment methods

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. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Section 13. Disposal considerations

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

Section 14. Transport information

DOT / TDG / Mexico / 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

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

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

Clean Water Act (CWA) 311: Edetic acid

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification :

DMSO	FLAMMABLE LIQUIDS - Category 4 EYE IRRITATION - Category 2B
Herculase II Fusion DNA Polymerase	EYE IRRITATION - Category 2B
5X Herculase II Reaction Buffer	Not applicable.

Composition/information on ingredients

Name	%	Classification
DMSO Dimethyl sulfoxide	100	FLAMMABLE LIQUIDS - Category 4 EYE IRRITATION - Category 2B
Herculase II Fusion DNA Polymerase Glycerol	≥50 - ≤75	EYE IRRITATION - Category 2B
5X Herculase II Reaction Buffer		COMBUSTIBLE DUSTS

Section 15. Regulatory information

Trometamol	≤3	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
Ammonium sulphate	≤3	EYE IRRITATION - Category 2A

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	**5X Herculase II Reaction Buffer** Ammonium sulphate	 7783-20-2	 ≤3
Supplier notification	**5X Herculase II Reaction Buffer** Ammonium sulphate	 7783-20-2	 ≤3

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: GLYCERINE MIST

New York : None of the components are listed.

New Jersey : The following components are listed: DIMETHYL SULFOXIDE; METHANE, SULFINYLBIS-; GLYCERIN; 1,2,3-PROPANETRIOL

Pennsylvania : The following components are listed: 1,2,3-PROPANETRIOL

California Prop. 65

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

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : Not determined.

Canada : Not determined.

China : Not determined.

Europe : Not determined.

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 : Not determined.

Section 15. Regulatory information

Viet Nam : Not determined.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
DMSO	
FLAMMABLE LIQUIDS - Category 4	On basis of test data
EYE IRRITATION - Category 2B	On basis of test data
Herculase II Fusion DNA Polymerase	
EYE IRRITATION - Category 2B	Calculation method

History

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Version : 7

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader

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