Material Safety Data Sheet

Version No.: 0.0(Enactment date: 2022-03-31)

ToxinCleanic Endotoxin Removal Kit

Endotoxin Removal Resin

1. Product And Company Information

A. Product Name : Endotoxin Removal Resin

B. Recommended Use : For Research Use Only

C. Supply information :

○ Company : Bioneer

○ Address : 8-11 Munpyeongseo-ro, Daedeok-gu, Daejeon 34302, Republic of Korea

○ Emergency telephone number : +82-42-930-8777

2. Risk, Hazard

A. Risk-Hazard Classification	Flammable liquid: Class 2 Serious eye damage/eye irritation: Class 2 Carcinogenicity: Class 1A

B. Caution Items Including Preventative measures

Pictogram

Signal word	Danger
Hazard statement(s)	H225 Highly flammable liquid and vapor. H319 Cause serious eye irritation. H350 Suspected of causing cancer.
Precautionary statements	
Prevention	P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P210 Keep away from heat·sparks·flame·high temperature – No smoking.

	P233 Keep container tightly closed. P240 Inosculate or ground the container and the equipment. P241 Use electric·ventilation·light equipment for explosion protection. P242 Use only non-sparking tools. P243 Take precautions against static electricity. P264 Wash the handling area thoroughly after use. P280 Wear protective gloves·protective cloth·safety glasses·respiratory mask.
Reaction	P303+P361+P353 If on skin (or hair), Take off all contaminated clothes. Rinse/shower skin with water. P305+P351+P338 If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308+P313 Get medical advice·attention if they are exposed or concerned about exposure. P337+P313 Get medical advice·attention if eye irritation persists. P370+P378 In the event of fire, suppress it with a water spray jet.
Storage	P403+P235 Store in a well-ventilated place and keep at low temperature. P405 Store in a locked storage area.
Disposal	P501 (In accordance with the contents of relevant laws) Dispose of container.
Ethanol	
Health	1
Fire	3
Reactivity	No information
Agarose	
Health	1
Fire	1
Reactivity	0

3. Composition/Information On Ingredient

Ethanol	Ethyl alcohol	64-17-5	10
Agarose	Sepharose	9012-36-6	50

4. First Aid Measure

A. Upon Eye contact	If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice·attention if eye irritation persists.
B. Upon Skin contact	If on skin (or hair), Take off all contaminated clothes. Rinse/shower skin with water. Get urgent medical attention.

	Remove contaminated clothes and shoes and isolate the contaminated area. Prevent spread to contaminated area when it causes minor skin contact. In case of burns, immediately cool the affected area with cold water for as long as possible, and do not remove cloth that adheres to the skin. Rinse skin with soap and water.
C. Upon Inhalation	Get medical advice·attention if they are exposed or concerned about exposure. Move to the area with fresh air. Keep it warm and stable.
D. Upon Ingestion	Get medical advice·attention if they are exposed or concerned about exposure. If the material is ingested or inhaled, do not perform mouth-to-mouth artificial respiration, and use appropriate respiratory medical equipment.
E. Notes to Physician	In case of exposure, contact physician and take special first aid measures such as follow-up. Ensure that Physician are aware of the material and take protective action.

5. Fire-fighting Measure

A. Proper(Improper) Extinguishing Material	
Proper(Improper) Extinguishing Material	Use alcohol foam, carbon dioxide or water spray for extinguishing involving this material. Use dry sand or soil for suffocation.
B. Specific Hazards from Chemicals	
Specific Hazards from Chemicals	Highly flammable liquids and vapors. May polymerize violently and cause fire and explosion. Vapors may transfer to an ignition source and ignite. During burning, pyrolysis or combustion may generate irritating and very toxic gas. May form explosive mixtures at or above flash point. Container may explode when heated. Highly flammable: Easily ignited by heat, and sparks. Leaks present a fire/explosion hazard. Risk of vapor explosion indoors, outdoors, and in sewers. Some can burn out but do not ignite easily. Vapors may form explosive mixtures with air.
Specific Hazards from Chemicals	Not-flammable, the material itself does not burn, but it may decompose when heated to generate corrosive/toxic fumes.
C. Firefighting Protective equipment and Precautions	
Ethanol	Rescuers must wear appropriate protective equipment. Get out of the area and keep a safe distance to extinguish.

	Be careful because most are lighter than water. Most vapors can diffuse along the ground and accumulate in low-lying areas or closed spaces because they are heavier than air. Move container from fire area if it is not hazardous. Do not pour directly into an exposure source or safety device as it may freeze in case of tank fire. Extinguish at maximum distance or use unmanned fire extinguishing equipment in case of tank fire. Cool container with plenty of water after fire is extinguished in case of tank fire. If there is a loud noise from the pressure relief device or if the tank is discolored, leave immediately in case of tank fire. Step away from tanks in flames in case of tank fire. Use unmanned fire extinguishing equipment and if not possible, step away and allow burn in case of large tank fires.
Agarose	Some may be transported at high temperatures. Leaks may cause contamination. Contact may cause skin and eye scald. Dig a ditch for disposal of fire water and do not allow material to dissipate. Move contain er from fire area if it is not hazardous. Cool container with plenty of water after extinguished in case of tank fire. If there is a loud noise from the pressure relief device or if the tank is discolored, leave immediately in case of tank fire. Step away from tanks in flames in case of tank fire.

6. Accidental Release Measure

A. Measures and protective equipment for Human body Protection	Remove all ignition sources as very fine particles may cause fire or explosion. Wipe up spills immediately and follow precautions in protective equipment section. Isolate the contaminated area. Do not enter unless required or without protective equipment. Remove all ignition sources. Be sure to ground all equipment when handling material. Stop leak if it is not hazardous. Do not touch damaged containers or spills without wearing appropriate protective clothes. Vapor suppressing foam may be used to reduce vapor generation. Cover with plastic sheeting to prevent spread. Be aware of materials and conditions to avoid.

B. Measures for Environmental Protection	Prevent entry into waterways, sewers, basements and confined spaces
C. Cleaning and Removal Measures	Build dikes to extinguish fire and collect water. Absorb spills with an inert material (Eg. dry sand or soil) and place in a chemical waste container. Absorb liquid and wash contaminated area with detergent and water. Ditch away the liquid spill when a large amount is leaked. Collect absorbed material using clean explosion-proof tools.

7. Handling And Storage

A. Handling Precautions	Do not handle until all safety precautions have been read and understood Use electric·ventilation·light equipment for explosion protection. Use only non-sparking tools. Take precautions against static electricity. Wash the handling area thoroughly after use. Do not apply pressure, cut, weld, solder, bond, pierce, abrade, or expose to heat, flame, sparks, static electricity, or other sources of ignition. Follow all MSDS/label precautions as product residues may remain after container is emptied. Use with caution in handling/storage. Open carefully the stopper before opening. Do not breathe vapors from heated material. Do not enter storage area without adequate ventilation. Be sure to ground all equipment when handling material. Be aware of materials and conditions to avoid. Be careful of heat. When working in a confined space in a low altitude, measure the oxygen concentration in the air and ventilate while working because there is a risk of oxygen deficiency.
B. Storage Precautions	Keep away from heat·sparks·flame·high temperature – No smoking. Keep container tightly closed. Store in a well-ventilated place and keep at low temperature. Store in a locked storage area. Empty drums should be completely drained and properly closed, immediately returned to drum control or properly placed.

8. Exposure Controls / Personal Protection

A. Chemical Exposure Standards, Biological Exposure Standards Etc.	
Domestic regulation	
Ethanol	TWA - 1000ppm
Agarose	No information
ACGIH regulation	
Ethanol	STEL 1000 ppm
Agarose	No information
Biological Exposure Standards	
Ethanol	No information
Agarose	No information
Other Exposure Standards	
Ethanol	No information
Agarose	No information
B. Proper Physical Management	Use process isolation, local exhaust ventilation or keep air levels below exposure limit. Facilities storing or using this material should be equipped with eyewash facilities and safety showers.
C. Personal Protection	
Respiratory Protection	
Ethanol	Wear a respiratory mask approved by KOSHA (Korea Occupation Safety Health Agency) for the physical and chemical properties of the particulate material to be exposed. If the exposure concentration is lower than 10000 ppm, wear a half-facepiece respiratory mask with an appropriate filter or septic tank. If the exposure concentration is lower than 25000 ppm, wear a loose-fitting hood/helmet powered respirator or continuous-flow dust respiratory mask/respirator (The dust respiratory mask is only for liquid aerosols) fitted with appropriate filter or septic tank. If the exposure concentration is lower than 50000 ppm, wear a full-facepiece or motorized half-facepiece or air-supplied continuous flow/pressure-required half-facepiece respirator with appropriate filter or septic tank. If the exposure concentration is lower than 1000000 ppm, wear a full-facepiece or hood/helmet type respirator or pressure-requiring ventilation mask with appropriate filter or septic tank. If the exposure concentration is lower than 10000000 ppm, wear a SCBA respiratory mask with appropriate filter or septic tank or pressure-requiring ventilation SCBA respiratory mask.
Agarose	Wear a respiratory mask approved by KOSHA (Korea Occupation Safety Health Agency) for the physical and chemical properties of the particulate material to be exposed. For particulate material, the following respirator is recommended - Filtering facepiece respiratory mask or filtering air respiratory mask (High efficiency particulate filter) or filtering facepiece respiratory mask with electric fan. (Dust, mist, filter media for fume)

	Wear a supplied air respiratory mask or self-contained respiratory mask in case of lack of oxygen (<19.6%)

9. Physical And Chemical Properties

A. Appearance	
appearance	No information
color	No information
B. Odor	No information
C. Odor threshold	No information
D. pH	No information
E. Melting point/Freezing point	No information
F. Initial boiling point/range	No information
G. Flash point	No information
H. Evaporation rate	No information
I. Flammability (Solid, Liquid)	No information
J. Flammability Limits upper/lower	No information
K. Vapor pressure	No information
L. Solubility	No information
M. Vapor density	No information
N. Viscosity	No information
O. n octanol/water partition coefficient	No information
P. Autoignition temperature	No information
Q. Decomposition temperature	No information
R. Specific gravity	No information
S. Molecular weight	No information
Ethanol	
A. Appearance	
appearance	Liquid
color	Colorless
B. Odor	Wine or whiskey odor
C. Odor threshold	10 ppm
D. pH	No information
E. Melting point/Freezing point	-114.1 ℃
F. Initial boiling point/range	78.5 ℃

G. Flash point	13 ℃ (c.c.)
H. Evaporation rate	No information
I. Flammability (Solid, Liquid)	No information
J. Flammability Limits upper/lower	3.3 / 19 %
K. Vapor pressure	59.3 ㎜ Hg (25℃)
L. Solubility	100 g/100 ㎖ (25℃)
M. Vapor density	1.59 (Air=1)
N. Viscosity	0.7893 (20℃)
O. n octanol/water partition coefficient	-0.31
P. Autoignition temperature	363 ℃
Q. Decomposition temperature	(Enthalpy change 1336.8 kJ/mol at 25℃)
R. Specific gravity	1.074 (20℃, mPa s)
S. Molecular weight	46.07
Agarose	
A. Appearance	
appearance	Solid
color	White taken gray(yellow)
B. Odor	Odorless
C. Odor threshold	(Not applicable (Odorless))
D. pH	No information
E. Melting point/Freezing point	60 ~ 90℃
F. Initial boiling point/range	No information
G. Flash point	No information
H. Evaporation rate	No information
I. Flammability (Solid, Liquid)	No information
J. Flammability Limits upper/lower	- / -
K. Vapor pressure	No information
L. Solubility	(Insoluble in water)
M. Vapor density	21.8
N. Viscosity	No information
O. n octanol/water partition coefficient	No information
P. Autoignition temperature	No information
Q. Decomposition temperature	No information
R. Specific gravity	No information
S. Molecular weight	630.5452

10. Stability And Reactivity

A. Chemical stability and possibility of harmful response.	
Ethanol	Highly flammable liquids and vapors May polymerize violently and cause fire and explosion. May form explosive mixtures at or above flash point. Container may explode when heated. Highly flammable: Easily ignited by heat, and sparks. Leaks present a fire/explosion hazard. Risk of vapor explosion indoors, outdoors, and in sewers. Vapors may form explosive mixtures with air. Vapors may move to an ignition source and flash back. Vapors may cause dizziness or suffocation without awareness. Irritating or burning skin and eyes by inhalation and contact.
Agarose	Stable under normal temperature and pressure conditions. Container may explode when heated. Some can burn out but do not ignite easily. Irritating and toxic gases may generate in case of fire. Inhalation of material may be harmful. Some liquids may produce vapors that cause dizziness and suffocation.
B. Conditions to avoid	
Ethanol	Keep away from heat·sparks·flame·high temperature – No smoking.
Agarose	Ignition sources such as heat, sparks, and flames.
C. Material to avoid	
Ethanol	No information
Agarose	Flammable material Irritating, toxic gas
D. Hazardous Decomposition Products	
Ethanol	During burning, pyrolysis or combustion may generate irritating and very toxic gas.
Agarose	No information

11. Toxicological Information

A. Probable Exposure Path	
Ethanol	No information
Agarose	May cause respiratory tract irritation if inhaled but low risk. May cause gastrointestinal irritation if ingested in large quantities Skin contact may cause irritation, but is usually a low risk. Dust can cause physical irritation.
B. Health Hazard Information	
Acute toxicity	
Oral	
Ethanol	LD50 7060 ㎎/㎏ Rat (OECD Guideline 401)
Agarose	No information
Transdermal	
Ethanol	No information
Agarose	No information
Inhalation	
Ethanol	Vapor LC50 30300 ㎎/㎥ 4 hr Mouse (OECD Guideline 403)
Agarose	No information
Skin corrosion or irritation	
Ethanol	No irritation occurred as a result of skin corrosion or irritation test using rabbit. (OECE Guideline 404, GLP)
Agarose	No information
Serious eye damage or irritation	
Ethanol	Conjunctivitis, conjunctival edema, Iris damage, corneal, damage occurred as a result of serious eye damage/irritation test using rabbit (Conjunctival Index : 2.1, Iris Index : 0.44 Conjunctival Edema Index :1.3 Corneal Index :1.1,OECD Guideline 405)
Agarose	No information
Respiratory hypersensitivity	
Ethanol	No information
Agarose	No information
Skin sensitivity	
Ethanol	No skin sensitization occurred as a result of skin sensitization test using mouse(male/female).
Agarose	No information
Carcinogenicity	
Occupational Safety and Health Act	
Ethanol	No information
Agarose	No information
Notice of Ministry of Employment and Labor.	
Ethanol	1A ((Only for alcoholic beverages))
Agarose	No information

IARC	
Ethanol	1 (Ethanol in alcoholic beverages)
Agarose	No information
OSHA	
Ethanol	No information
Agarose	No information
ACGIH	
Ethanol	A3
Agarose	No information
NTP	
Ethanol	No information
Agarose	No information
EU CLP	
Ethanol	No information
Agarose	No information
Germ cell mutagenicity	
Ethanol	Positive result of dominant lethality test using rodents in vivo(OECD Guideline 478) Negative result of the spot test using mouse in vivo(OECD Guideline 484) Negative result of the micronucleus test using mammalian red blood cells in vivo(OECD Guideline 474) Negative result of chromosomal abnormality test using mammalian bone marrow cells in vivo(OECD Guideline 475)
Agarose	No information
Reproductive toxicity	
Ethanol	No significant effect as a result of development toxicity/teratogenicity/maternal toxicity test using rats. (development toxicity NOAEL = 4000mg/kg, teratogenicity NOAEL = 5200mg/kg, maternal toxicity LOAEL = 8200mg/kg)(OECD Guideline 415)
Agarose	No information
Specific target organ toxicity (1 exposure)	
Ethanol	Twitching and vestibular function were suppressed as a result of oral toxicity test using rabbit.
Agarose	No information
Specific target organ toxicity (Repeated exposure)	
Ethanol	No significant effect as a result of repeated oral toxicity test(98d) using rats(female/male).
Agarose	No information
Aspiration hazard	
Ethanol	No information
Agarose	No information

Other hazard effect	
Ethanol	No information
Agarose	No information

12. Ecological Information

A. Biological Toxicity	
Fish	
Ethanol	LC50 > 100 ㎎/ℓ 96 hr Pimephales promelas
Agarose	No information
Shellfish	
Ethanol	LC50 5012 ㎎/ℓ 48 hr Ceriodaphnia dubia (other guideline: ASTM E729-80)
Agarose	No information
Bird	
Ethanol	ErC50 275 ㎎/ℓ 72 hr Chlorella vulgaris (OECD Guideline 201)
Agarose	No information
B. Persistency and Degradability	
Persistency	
Ethanol	log Kow -0.35
Agarose	No information
Degradability	
Ethanol	No information
Agarose	No information
C. Bioconcentration	
concentration	
Ethanol	BCF 1
Agarose	No information
Biodegradability	
Ethanol	71 % (Biodegradability)
Agarose	No information

D. Soil Mobility	
Ethanol	No information
Agarose	No information
E. Other Toxic Effects	
Ethanol	Shellfish: Daphnia magna: NOEC, 9d, = 9.6 mg/L Bird: Skeletonema costatum: NOEC, 120h, = 3240mg/L
Agarose	No information

13. Disposal Considerations

A. Waste disposal method	
Ethanol	Dispose of it in one of the following ways. 1. Incinerate. 2. After treatment by evaporation · concentration method, incinerate the residue. 3. Incinerate the residue after purification by separation · distillation · extraction · filtration methods. 4. Treat using the reaction of neutralization · oxidation · reduction · polymerization · condensation. 5. Incinerate the residue or reprocess them by coagulation · sedimentation · filtration · dehydration methods and then incinerate the residue.
Agarose	Dispose of contents and container in accordance with regulation if specified in the Waste Management Act.
B. Disposal Considerations	
Ethanol	(In accordance with the provisions of the relevant regulation) Dispose of contents container.
Agarose	(In accordance with the provisions of the relevant regulation) Dispose of contents container.

14. Transport Information

A. UN number (UN No.)	
Ethanol	1170
Agarose	No information on the classification of UN transport hazardous material.
B. UN Proper Shipping Name	
Ethanol	Ethanol or Ethanol solution
Agarose	Not applicable
C. Shipping Hazard Classification	
Ethanol	3
Agarose	Not applicable
D. Container Classification	
Ethanol	II
Agarose	Not applicable

E. Marine Pollutant	
Ethanol	Not applicable
Agarose	No information
F. Special Safety Measures for Users Regarding Shipping or Shipping Measure	
Emergency measures in case of fire	
Ethanol	F-E
Agarose	Not applicable
Emergency measures in case of spillage	
Ethanol	S-D
Agarose	Not applicable

15. Regulatory Information

A. Regulation under the Occupational Safety and Health Act	
Ethanol	Process safety management (PSM) materials subject to submission.
Ethanol	Exposure standard setting materials
Agarose	No information
B. Regulation under the Chemicals Control Act	
Ethanol	No information
Agarose	No information
C. Regulation under the Dangerous Materials Safety Management Act	
Ethanol	Class 4 alcohol 400L
Agarose	No information
D. Regulation by the Waste Management Act	
Ethanol	Designated waste
Agarose	No information
E. Regulation by other domestic and foreign laws	
Domestic regulation	
Other domestic regulation	
Ethanol	Not applicable
Agarose	Not applicable
Foreign regulation	
US management information (OSHA regulation)	
Ethanol	Not applicable
Agarose	Not applicable
US management information (CERCLA regulation)	
Ethanol	Not applicable

Agarose	Not applicable
US management information (EPCRA 302 regulation)	
Ethanol	Not applicable
Agarose	Not applicable
US management information (EPCRA 304 regulation)	
Ethanol	Not applicable
Agarose	Not applicable
US management information (EPCRA 313 regulation)	
Ethanol	Not applicable
Agarose	Not applicable
US management information (Rotterdam Convention Materials)	
Ethanol	Not applicable
Agarose	Not applicable
US management information (Stockholm Convention Materials)	
Ethanol	Not applicable
Agarose	Not applicable
US management information (Montreal Protocol Materials)	
Ethanol	Not applicable
Agarose	Not applicable
EU Classification Information(Final classification result)	
Ethanol	Flam. Liq. 2
Agarose	Not applicable
EU Classification Information (Hazard statement)	
Ethanol	H225
Agarose	Not applicable
EU Classification Information (Safety statement)	
Ethanol	Not applicable
Agarose	Not applicable

16. Other Reference

A. Source of data

Ethanol

HSDB (appearance)
HSDB (color)
HSDB (B. Odor)
HSDB (E. Melting point/Freezing point)
HSDB (F. Initial boiling point/range)
HSDB (G. Flash point)
IPCS (J. Flammability Limits upper/lower)
HSDB (K. Vapor pressure)
HSDB (L. Solubility)
HSDB (M. Vapor density)
HSDB (N. Viscosity)
HSDB (O. n octanol/water partition coefficient)
IPCS (P. Autoignition temperature)
HSDB (Q. Decomposition temperature)
HSDB (R. Specific gravity)
HSDB (S. Molecular weight)
ECHA(Oral)
ECHA(Inhalation)
ECHA(Skin corrosion or irritation)
ECHA(Serious eye damage or irritation)
ECHA(Skin sensitivity)
ECHA(Germ cell mutagenicity)
ECHA(Reproductive toxicity)
HSDB(Specific target organ toxicity (1 exposure))
ECHA(Specific target organ toxicity (repeated exposure))
SIDS 2005(Fish)
ECHA(Shellfish)
ECHA(Bird)
ECHA(Persistency)
ECHA(concentration)
ECHA(E. Other hazard effect)

Agarose

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)(appearance)

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)(color)

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)(B. Odor)

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)(E. Melting point/Freezing point)

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd)(L. Solubility)

Calculated value based on molecular weight and average of molecular weight of air (M. Vapor density)

ChemIDplus(S. Molecular weight)

Akron University(http://ull.chemistry.uakron.edu/erd/)(A. Information on likely routes of exposure)

Akron University(http://ull.chemistry.uakron.edu/erd/) (Pyrolysis products)

The Chemical Database, The Department of Chemistry at the University of Akron(http://ull.chemistry.uakron.edu/erd) (Product use)

B. Date of original creation	2022-03-31
C. Revision number and last revision date	
Revision number	0
Last revision date	0
D. Other	Bioneer Corporation makes no warranty or representation to its completeness, accuracy or currency. This material is intended for use by persons with pertinent technical skills and at their discretion and risk. It is the responsibility of the user to determine the product's suitability for its intended use, the product's safe use, and the product's proper disposal. Disposal of hazardous material may be subject to federal, state or local laws or regulations.

○ The prepared Material Safety Data Sheet(MSDS) has been edited and partially modified by referring to the MSDS provided by the KOSHA (Korea Occupation Safety Health Agency).