

according to Regulation UK SI 2019/758 and UK SI 2020/1577 as amended

Revision Date 30-Nov-2024

Revision Number 4

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THECOMPANY/UNDERTAKING

1.1. Product identifier	
Product Description: Cat No. :	<u>Sulfur in Isooctane standard solution, Specpure®, 15 μg/g (0.0015%)</u> 45352
1.2. Relevant identified uses of the	substance or mixture and uses advised against
Recommended Use Sector of use Product category Process categories Environmental release category Uses advised against	Laboratory chemicals. SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites PC21 - Laboratory chemicals PROC15 - Use as a laboratory reagent ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates) No Information available
1.3. Details of the supplier of the sa	afety data sheet
Company	Avocado Research Chemicals Ltd. (Part of Thermo Fisher Scientific) Shore Road, Heysham Lancashire, LA3 2XY, United Kingdom Office Tel: +44 (0) 1524 850506 Office Fax: +44 (0) 1524 850608
E-mail address	begel.sdsdesk@thermofisher.com
1.4. Emergency telephone number	For information US call: 001-800-227-6701 / Europe call: +32 14 57 52 11 Emergency Number US: 001-201-796-7100 / Europe: +32 14 57 52 99 CHEMTREC Tel. No. US: 001-800-424-9300 / Europe: 001-703-527-3887
Poison Centre - Emergency information services	Ireland : National Poisons Information Centre (NPIC) - 01 809 2166 (8am-10pm, 7 days a week) Malta : +356 2395 2000 Cyprus : +357 2240 5611
	SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

GHS Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567

Physical hazards

Flammable liquids

Category 2 (H225)

Sulfur in Isooctane standard solution, Specpure®, 15 µg/g (0.0015%)

Health hazards

Aspiration Toxicity Skin Corrosion/Irritation Specific target organ toxicity - (single exposure)

Environmental hazards

Acute aquatic toxicity Chronic aquatic toxicity Category 1 (H304) Category 2 (H315) Category 3 (H336)

Category 1 (H400) Category 1 (H410)

Full text of Hazard Statements: see section 16



Signal Word

Danger

Hazard Statements

- H225 Highly flammable liquid and vapor
- H304 May be fatal if swallowed and enters airways
- H315 Causes skin irritation
- H336 May cause drowsiness or dizziness
- H410 Very toxic to aquatic life with long lasting effects

Precautionary Statements

P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician

- P331 Do NOT induce vomiting
- P280 Wear protective gloves/protective clothing

P264 - Wash face, hands and any exposed skin thoroughly after handling

P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

2.3. Other hazards

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB)

This product does not contain any known or suspected endocrine disruptors

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Component	CAS No	EC No	Weight %	GHS Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567
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Sulfur in Isooctane standard solution, Specpure®, 15 µg/g (0.0015%)

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Isooctane	540-84-1	EEC No. 208-759-1	100.00	Flam. Liq. 2 (H225) Asp. Tox. 1 (H304) Skin Irrit. 2 (H315) STOT SE 3 (H336) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)
Butane, 1,1'-thiobis-	544-40-1	EEC No. 208-870-5	0.00	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) STOT SE 3 (H335)

Component	Specific concentration limits (SCL's)	M-Factor	Component notes
Isooctane	-	1	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs (by aspiration).
Self-Protection of the First Aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.
4.2. Most important symptoms and	effects, both acute and delayed
	Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
4.3. Indication of any immediate me	edical attention and special treatment needed
Notes to Physician	Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media

Carbon dioxide (CO₂). Powder. Water spray. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. Water mist may be used to cool closed containers.

Extinguishing media which must not be used for safety reasons

Sulfur in Isooctane standard solution, Specpure®, 15 µg/g (0.0015%)

No information available.

5.2. Special hazards arising from the substance or mixture

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products

Carbon monoxide (CO), Carbon dioxide (CO₂), Sulfur oxides.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

6.2. Environmental precautions

Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat, sparks and flame.

Technical Rules for Hazardous Substances (TRGS) 510 Class 3 Storage Class (LGK) (Germany) Sulfur in Isooctane standard solution, Specpure®, 15 µg/g (0.0015%)

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits List source(s):

Biological limit values

This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Derived No Effect Level (DNEL) / Derived Minimum Effect Level (DMEL)

See table for values

Component	Acute effects local	Acute effects	Chronic effects local	Chronic effects
	(Oral)	systemic (Oral)	(Oral)	systemic (Oral)
Isooctane 540-84-1 (100.00)				699 mg/kg bw/day

Component	Acute effects local (Dermal)	Acute effects systemic (Dermal)	Chronic effects local (Dermal)	Chronic effects systemic (Dermal)
Isooctane 540-84-1(100.00)				DNEL = 773mg/kg bw/day

Component	Acute effects local (Inhalation)	Acute effects systemic (Inhalation)	Chronic effects local (Inhalation)	Chronic effects systemic (Inhalation)
Isooctane 540-84-1 (100.00)				DNEL = 2035mg/m ³

Predicted No Effect Concentration (PNEC)

No information available.

8.2. Exposure controls

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment Eye Protection

Wear safety glasses with side shields (or goggles) (European standard - EN 166)

Hand Protection

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Nitrile rubber	480 minutes	0.2 mm	EN 374	(minimum requirement)
Skin and body prot	ection Long sle	eved clothing.		

Protective gloves

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Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Respiratory Protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly
Large scale/emergency use	In case of insufficient ventilation, wear suitable respiratory equipment Recommended Filter type: Organic gases and vapours filter
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. When RPE is used a face piece Fit Test should be conducted
Environmental exposure controls	Prevent product from entering drains. Do not allow material to contaminate ground water system. Local authorities should be advised if significant spillages cannot be contained.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Liquid	
Appearance	Colorless	
Odor	Petroleum distillates	
Odor Threshold	No data available	
Melting Point/Range	No data available	
Softening Point	No data available	
Boiling Point/Range	No information available	
Flammability (liquid)	Highly flammable	On basis of test data
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	
Flash Point	-12 °C / 10.4 °F	Method - No information available
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
pH	No information available	
Viscosity	No data available	
Water Solubility	Immiscible	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/wate	er)	
Vapor Pressure	23 hPa @ 20 °C	
Density / Specific Gravity	No data available	
Bulk Density	Not applicable	Liquid
Vapor Density	No data available	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	
9.2 Other information		

9.2. Other information

Explosive Properties

Vapors may form explosive mixtures with air

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SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous Reactions	No information available. None under normal processing.
10.4. Conditions to avoid	Keep away from open flames, hot surfaces and sources of ignition.
10.5. Incompatible materials	Acids. Strong bases. Oxidizing agent.

10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO₂). Sulfur oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;

OralBased on available data, the classification criteria are not metDermalBased on available data, the classification criteria are not metInhalationBased on available data, the classification criteria are not met

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Isooctane	LD50 5000 mg/kg (Rat)	2000 mg/kg (Rabbit)	LC50 = 33.52 mg/L (Rat)4 h
Butane, 1,1'-thiobis-	LD50 = 2220 mg/kg (Rat)	-	_

(b) skin corrosion/irritation; Category 2

(c) serious eye damage/irritation; Based on available data, the classification criteria are not met

(d) respiratory or skin sensitization; Respiratory Skin	Based on available data, the classification criteria are not met Based on available data, the classification criteria are not met
(e) germ cell mutagenicity;	Based on available data, the classification criteria are not met
(f) carcinogenicity;	Based on available data, the classification criteria are not met
	There are no known carcinogenic chemicals in this product

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(g) reproductive toxicity;	Based on available data, the classification criteria are not met
(h) STOT-single exposure;	Category 3
Results / Target organs	Central nervous system (CNS).
(i) STOT-repeated exposure;	Based on available data, the classification criteria are not met
Target Organs	None known.
(j) aspiration hazard;	Category 1
Symptoms / effects,both acute and delayed	Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.
11.2. Information on other hazards	
Endocrine Disrupting Properties	Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity Ecotoxicity effects

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Fish	Water Flea	Freshwater Algae
Isooctane	LC50 = 0.11 mg/l, 96h, (Rainbow	EC50= 0.4 mg/l, 48h (Daphnia	EC50= 2.94 mg/l, 72h
	trout)	magna)	
Butane, 1,1'-thiobis-	LC50: = 3.58 mg/L, 96h flow-through (Pimephales promelas)		

Component	Microtox	M-Factor
Isooctane		1

12.2. Persistence and degradability

Persistence Degradation in sewage treatment plant	Immiscible with water. Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.
12.3. Bioaccumulative potential	May have some potential to bioaccumulate
12.4. Mobility in soil	Spillage unlikely to penetrate soil Is not likely mobile in the environment due its low water solubility.
<u>12.5. Results of PBT and vPvB</u> assessment	Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB).
12.6. Endocrine disrupting	

properties

Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects	
Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products	Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.
Contaminated Packaging	Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.
European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Can be landfilled or incinerated, when in compliance with local regulations. Do not let this chemical enter the environment. Do not empty into drains.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

<u>14.1. UN number</u> <u>14.2. UN proper shipping name</u> <u>14.3. Transport hazard class(es)</u> <u>14.4. Packing group</u> Marine Pollutant	UN1262 OCTANES 3 II This product contains a chemical which is listed as a marine pollutant according to IMDG/IMO
ADR	
<u>14.1. UN number</u> 14.2. UN proper shipping name 14.3. Transport hazard class(es) 14.4. Packing group	UN1262 OCTANES 3 II
IATA	
<u>14.1. UN number</u> 14.2. UN proper shipping name 14.3. Transport hazard class(es) 14.4. Packing group	UN1262 OCTANES 3 II
14.5. Environmental hazards	Dangerous for the environment Product is a marine pollutant according to the criteria set by IMDG/IMO

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14.6. Special precautions for user No special precautions required.

14.7. Maritime transport in bulk according to IMO instruments

SECTION 15: REGULATORY INFORMATION

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

Not applicable, packaged goods

International Inventories

Europe (EINECS/ELINCS/NLP), China (IECSC), Taiwan (TCSI), Korea (KECL), Japan (ENCS), Japan (ISHL), Canada (DSL/NDSL), Australia (AICS), New Zealand (NZIoC), Philippines (PICCS). US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

Component	CAS No	EINECS	ELINCS	NLP	IECSC	TCSI	KECL	ENCS	ISHL
Isooctane	540-84-1	208-759-1	-	-	Х	Х	KE-34634	Х	Х
Butane, 1,1'-thiobis-	544-40-1	208-870-5	-	-	Х	Х	-	Х	Х

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	DSL	NDSL	AICS	NZIoC	PICCS
Isooctane	540-84-1	Х	ACTIVE	Х	-	Х	Х	Х
Butane, 1,1'-thiobis-	544-40-1	X	ACTIVE	Х	-	Х	Х	X

Legend: X - Listed '-' - Not Listed

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Isooctane	540-84-1	-	Use restricted. See entry	-
			75.	
			(see link for restriction	
			details)	
Butane, 1,1'-thiobis-	544-40-1	-	-	-

REACH links

https://echa.europa.eu/substances-restricted-under-reach

Seveso III Directive (2012/18/EC)

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements
Isooctane	540-84-1	Not applicable	Not applicable
Butane, 1,1'-thiobis-	544-40-1	Not applicable	Not applicable

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals

Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)? Not applicable

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at

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work .

National Regulations

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

WGK Classification

Water endangering class = 2 (self classification)

Component	Germany - Water Classification (AwSV)	Germany - TA-Luft Class
Isooctane	WGK2	
Butane, 1,1'-thiobis-	WGK2	

Component	Switzerland - Ordinance on the Reduction of Risk from handling of hazardous substances preparation (SR 814.81)	Switzerland - Ordinance on Incentive Taxes on Volatile Organic Compounds (OVOC)	Switzerland - Ordinance of the Rotterdam Convention on the Prior Informed Consent Procedure
Isooctane 540-84-1(100.00)	Prohibited and Restricted Substances		

15.2. Chemical safety assessment

Chemical Safety Assessment/Reports (CSA/CSR) are not required for mixtures

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

- H304 May be fatal if swallowed and enters airways
- H315 Causes skin irritation
- H336 May cause drowsiness or dizziness
- H400 Very toxic to aquatic life
- H410 Very toxic to aquatic life with long lasting effects
- H225 Highly flammable liquid and vapor
- H319 Causes serious eye irritation
- H335 May cause respiratory irritation

Legend

CAS - Chemical Abstracts Service	TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances PICCS - Philippines Inventory of Chemicals and Chemical Substances IECSC - Chinese Inventory of Existing Chemical Substances KECL - Korean Existing and Evaluated Chemical Substances	,
WEL - Workplace Exposure Limit ACGIH - American Conference of Governmental Industrial Hygienists DNEL - Derived No Effect Level RPE - Respiratory Protective Equipment LC50 - Lethal Concentration 50% NOEC - No Observed Effect Concentration PBT - Persistent, Bioaccumulative, Toxic	 TWA - Time Weighted Average IARC - International Agency for Research on Cancer Predicted No Effect Concentration (PNEC) LD50 - Lethal Dose 50% EC50 - Effective Concentration 50% POW - Partition coefficient Octanol:Water vPvB - very Persistent, very Bioaccumulative

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ADR - European Agreement Concerning the International Carriage of	ICAO/IATA - International Civil Aviation Organization/International Air			
Dangerous Goods by Road	Transport Association			
IMO/IMDG - International Maritime Organization/International Maritime	MARPOL - International Convention for the Prevention of Pollution from			
Dangerous Goods Code	Ships			
OECD - Organisation for Economic Co-operation and Development	ATE - Acute Toxicity Estimate			
BCF - Bioconcentration factor	VOC - (Volatile Organic Compound)			
Key literature references and sources for data https://echa.europa.eu/information-on-chemicals Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS				
Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:				
Physical hazards On basis of test data				
Health Hazards Calculation method				
Environmental hazards Calculation method				

Training Advice Chemical incident response training.

Prepared By	Heal
Revision Date	30-N
Revision Summary	Not a

Ith, Safety and Environmental Department Nov-2024 applicable.

This safety data sheet complies with Regulation UK SI 2019/758 and UK SI 2020/1577 as amended.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet