



KYNOCH FERTILIZER

SAFETY DATA SHEET

Zest

Date Issued / Revised Date : 25 September 2022
New version : 3.0
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Prepared according to: United Nations GHS (Rev 9E) (2021) and SANS 10234:2019
(This Safety Data Sheet conforms to the requirements set by the Department of Agriculture, Land reform and Rural development of the Republic of South Africa on the 29 March 2022)

SECTION 1: IDENTIFICATION

1.1 GHS¹ product identification

Product Name : **Zest**

¹ GHS - Globally Harmonized System of Classification and Labelling of Chemicals

1.2 Other means of identification

Description : **Blend (N,P,K and S) made with > 10% Urea, with boron**
CAS Number : **N/A**
EC Number³ : **N/A**

² "CAS Number" - CAS Number is a numerical designation for chemicals that is maintained by the Chemical Abstracts Service (CAS) of the American Chemical Society.

³ "EC Number" - The European Community number (EC number) is a unique identifier that was assigned to substances for regulatory purposes within the European Union by the European Commission.

1.3 Recommended use of materials and restrictions on use

Recommended use of material : **Intended to be used as a fertilizer and in fertilizer blends**
Description : **Source of plant nutrients**
Restrictions on use : **None Identified**

1.4 Supplier's details

Supplier's details : **1st Floor, ETG House**
62 Weirda Road East
Sandton
2196
Tel no: (011) 317-2000

1.5 Emergency phone number

Emergency phone number : **Dial Triple Zero (000) and ask for fire**
: **Ambulance or the Fire department – 10177**
: **Kynoch – 086 092 7272**
: **Spilltech - 086 100 0366**

SECTION 2: HAZARD IDENTIFICATION

2.1 Classification of substance or mixture

Product Defined : **Mixture**

Summarized Classification:

Types of Hazards	Hazard Class	Category/subcategory	H-Statement
Physical Hazards	Not Classified		
Health Hazards	Eye Irritation	Category 2A	H319
	Reproductive toxicity	Category 1	H306
Environmental Hazards	Hazardous to the aquatic environment, acute hazard	Category 3	H402

Classification according to the United Nations GHS (Rev 9E) (2021) and SANS 10234:2019

¹ "Not Classified" – Data conclusive but not at sufficient levels for classification.

² "H-Statement" – Hazard Statement. Full decryption in Section16

Classification per Substance:

Description	CAS Number	Classification
Urea	57-13-6	Eye Irritation, Cat 2A
MAP	7722-76-1	No Classification
Potassium Chloride	7447-40-7	No Classification
Potassium Sulphate	7778-80-5	No Classification
Boronate (represented by Boric Acid)	10043-35-3	Rep. Tox., Cat 1
Zinc Oxide	1314-13-2	Haz. Aquatic., Cat 1

Reference: (European Chemical Agency [ECHA], n.d.) & (Environmental protection agency [EPA]. New Zealand Government, n.d.) & (The Australian Industrial Chemicals Introduction Scheme [AICIS], n.d.) & (International Labour organization [ILO], n.d.)

2.2 GHS Label elements, including precautionary statements

Pictogram



Pictogram Name

: **Health Hazard, Exclamation**

Signal Word

: **Danger**

Hazard Statements

: **H319** - **Causes serious eye irritation**
: **H360** - **May damage fertility or the unborn child**
H402 - **Harmful to aquatic life**

- Precautionary Statements : P203 - Obtain, read and follow all safety instructions before use.
 : P264 - Wash hands [and ...] thoroughly after handling.
 : P265 - Do not touch eyes.
 : P280 - Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
 P273 - Avoid release to the environment.

Reference: (Pubchem, GHS, n.d.)

2.3 Other hazards that do not result in classification

Hazards : N/A

Reference: (European Chemical Agency [ECHA], n.d.) & (Pubchem, search, n.d.)

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substance

Substance : N/A

¹ "N/A" – Not available

Reference: (European Chemical Agency [ECHA], n.d.) & (The Australian Industrial Chemicals Introduction Scheme [AICIS], n.d.)

3.2 Mixture

Substance A:

Common name : Urea Granular
 Composition > 10%
 EC Name Carbamide
 Chemical Formula : CH₄N₂O
 Molecular Weight : 60,05 g/mol
 Nutrient Content : 46% N
 CAS Number : 57-13-6
 EC Number : 200-315-5

Substance B:

Common name : Mono Ammonium Phosphate
 Composition : 0-80%
 EC Name : Ammonium dihydrogen orthophosphate
 Chemical Formula : (NH₄)(H₂PO₄)
 Molecular Weight : 115,025 g/mol
 Nutrient Content : 11% N 22% P
 CAS Number : 7722-76-1
 EC Number : 231-764-5

Substance C:

Common name : **Potassium Chloride Granular**
Composition : **0-50%**
EC Name : **Potassium Chloride**
Chemical Formula : **KCl**
Molecular Weight : **74.55 g/mol**
Nutrient Content : **50% K**
CAS Number : **7447-40-7**
EC Number : **200-315-5**

Substance D:

Common name : **Potassium Sulphate**
Composition : **0-50%**
EC Name : **Potassium Sulphate**
Chemical Formula : **K₂SO₄**
Molecular Weight : **174.26 g/mol**
Nutrient Content : **42% K, 17%S**
CAS Number : **7778-80-5**
EC Number : **231-915-5**

Substance E:

Common name : **Boronate (Represented by Boric Acid)**
Composition : **>0.1% <2%**
EC Name : **Boric Acid**
Chemical Formula : **H₃BO₃**
Molecular Weight : **61,83 g/mol**
Nutrient Content : **17%B**
CAS Number : **10043-35-3**
EC Number : **233-139-2**

Substance F:

Common name : **Zinc Oxide**
Composition : **< 1.6%**
EC Name : **Zinc Oxide**
Chemical Formula : **ZnO**
Molecular Weight : **81,38 g/mol**
Nutrient Content : **40% Zn**
CAS Number : **1314-13-2**
EC Number : **215-222-5**

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General information	: No special measures required.
After inhalation	: Supply fresh air. Consult doctor in case of complaints.
After skin contact	: Remove affected clothing. Immediately rinse with water (can use mild soap). If skin irritation continues, consult a doctor.
After eye contact	: Rinse opened eye for several minutes under running water (remove contact lenses if easily possible). Seek medical treatment.
After swallowing	: Rinse out mouth. Make victim drink water (maximum of 2 drinking glasses). Do NOT induce vomiting. If symptoms persist consult doctor.

4.2 Most important symptoms and effects, both acute and delayed

Effects	: Eye irritation, reproductive toxicity
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4.3 Indication of any immediate medical attention and special treatment needed

Effects	: Observation only is required for adult ingestion of less than 6 grams of boric acid. For ingestion in excess of 6 grams, maintain adequate kidney function and force fluids.
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SECTION 5: FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing medium

Suitable extinguishing agents	: Water, CO ₂ , foam, powder
Inappropriate extinguishing media	: No information available
Notes	: Use fire extinguishing methods suitable to surrounding conditions.

5.2 Specific hazards arise from chemical

Warning	: Formation of toxic gases is possible during heating or in case of fire.
Hazardous Combustion Products	: Nitrogen oxides (NO _x). Carbon monoxide (CO). Carbon dioxide (CO ₂). Ammonia.
Fire hazard	: Non-flammable substance
Explosion hazard	: Not applicable
Reactivity	: None

5.3 Special protective action for Fire-Fighters

Special protective actions for fire-fighters	: 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
- : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
 - : Clothing for fire-fighters (including helmets, protective boots, and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment, and emergency procedures

- Percussions
- : No action shall be taken involving any personal risk or without suitable training.
- Equipment
- : Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- Procedure
- : Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Provide adequate ventilation.

¹ PPE – Personal precautions, protective equipment.

6.2 Environmental precautions

- Environmental
- : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.
 - : Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil, or air).
 - : Discharge into the environment must be avoided.

6.3 Methods and material for containment and cleaning up

- Small Spill
- : Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.
- Large Spill
- : Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements, or confined areas. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections

- Section 7
- : Information on safe handling.
- Section 8
- : Information on personal protection equipment.
- Section 13
- : For disposal information.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

- Handling : **Ensure adequate ventilation. Avoid ingestion and inhalation. Avoid dust formation. Wear protective gloves/eye protection/face protection/. Do not get in eyes, on skin, or on clothing. Wash hands thoroughly after handling.**
- : **Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed.**
- : **For precautions see section 2.2.**

7.2 Conditions for safe storage, including any incompatibilities

- Storerooms and receptacles : **No special requirements.**
- One common storage facility : **Store away from oxidising agents.**
- Handling of product : **Keep container tightly closed.**
- Room conditions : **Keep in a dry, well-ventilated place. Recommended storage temperature at < 30°C. (Room temperature). DO NOT expose the substance to temperatures above 50 °C.**
- : **Protect against humidity**
- Storage Class : **(TRGS 510): 10 - 13 Other liquids and solids: Non-Combustible Solids**

Reference: (BAUA, 2016)

7.3 Specific end use(s)

- Specific end use(s) : **Apart from the uses mentioned in section 1.3 no other specific uses are stipulated**

SECTION 8: EXPOSURE CONTROL AND PERSONNEL PROTECTION

8.1 Control Parameters

	Compound	Cas Number		TWA ¹	STEL ²
OCHA	Urea	57-13-6		10mg/l	Not Listed
OCHA	MAP	7722-76-1		Not Listed	Not Listed
OCHA	Potassium Chloride	7447-40-7		Not Listed	Not Listed
OCHA	Potassium Sulphate	7778-80-5		Not Listed	Not Listed

¹ TWA – Long term exposure: Time Weighted Average (8-hour period)

² STEL – Short term exposure: Short term exposure limit (15 min period)

Reference: (South African Labour Department, 2021) & (ILO, n.d.) & (OSHA, n.d.)

- Routes of exposure : **The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.**
- Inhalation risk : **Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly, especially if powdered.**
- Effects of short-term exposure : **Contact can irritate the skin and eyes**
- Effects of long-term or repeated exposure : **Repeated exposure to ammonia may cause chronic irritation of the respiratory tract.**

Reference: (ILO, n.d.)

8.2 Appropriate engineering controls

- : **Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations, and safety showers are close to the workstation location. See Section 7.**

8.2 Individual protection measures

- Eye/face protection : **Wear safety glasses.**
Use equipment for eye protection tested and approved under appropriate government standards. SABS adoption: SANS 50166:2018(SA), EN 166(EU) or NIOSH (US).
- Skin Protection : **Handle with gloves.**
Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
- Body Protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
- Respiratory protection : **Not required under normal conditions of use.**
Where protection from nuisance levels of dusts is desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
- Control of environmental exposure : **No special environmental precautions required**



SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Properties

- Physical state : **Solid**¹
- Composition : **Mixture**²
- Colour : **Colourless / White to brown, red and black**

Odour	: Odourless
Melting point/freezing point	: 133-134 °C
Boiling point or initial boiling point and boiling range	: Decomposes
Flammability	: Product is not flammable
Lower and upper explosion limit/flammability limit	: Not determined
Flash point	: Not applicable
Auto-ignition temperature	: Not determined
Oxidizing Properties	: Non oxidizer
Decomposition temperature	: ≥150 °C
pH	: Not Available
Kinematic viscosity	: N/A
Solubility	: N/A
Partition coefficient: n-octanol/water (log value)	: N/A
Vapour pressure	: N/A
Density and/or relative density	: N/A
Relative vapour density	: N/A
Bulk Density (Volumetric)	: N/A
Particle characteristics	: between 0.1 - 5mm
Molecular Formula	: N/A
Molecular Weight	: N/A

¹ "Solid" – Is a substance that cannot be classified as a liquid or Gas.

² "Substance" – Is chemical elements and their compounds in their natural state or obtained by production process)

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

SECTION 10: STABILITY AND REACTIVITY

Reactivity	: None known, based on information available
Chemical stability	: Stable under normal conditions
Hazardous Reactions	: None under normal processing, Boric Acid: Possibility of hazardous reactions: Reaction with strong reducing agents such as metal hydrides or alkali metals will generate hydrogen gas which could create an explosive hazard.
Conditions to Avoid	: Incompatible products
Incompatible Materials	: Urea: strong oxidizing agents, Chlorine, sodium hypochlorite MAP: Magnesium, Strong acids, bases. KCl: Strong acids and strong oxidizing agents
Hazardous Decomposition Products	: Urea: Products Nitrogen oxides (NOx), Carbon monoxide (CO), Carbon dioxide (CO2), Ammonia MAP: Toxic fumes: Ammonia KCl: Potassium oxides and chlorine gas

SECTION 11: TOXICOLOGY

11.1 Acute Toxicity

Classification : **No Classification**
 Description : **No substance by itself qualifies for classification, therefore the fanning mixture is not classified.**

Substance A:

Method	Compound	Cas Number	LD50	Subject
Oral	Urea	57-13-6	14.3-15 g/kg	Rat
			11.5-13 g/kg	Mouse
Dermal	No data are available. Urea is demonstrated to be of very low acute toxicity by the oral, subcutaneous and intravenous routes in the rat and mouse. Testing for acute dermal toxicity is not justified.			
Inhalation	No data are available. The substance is a non-volatile solid and is produced as crystals with a particle size of >100 µm. There is therefore no potential for inhalation exposure.			
Subcutaneous	Urea	57-13-6	8.2-9.4 g/kg	Rat
			9.2-10.7 g/kg	Mouse
Intravenous	Urea	57-13-6	5.3-5.4 g/kg	Rat
			4.6-5.2 g/kg	Mouse

Substance B:

Method	Compound	Cas Number	Measure	Value	Subject
Oral	MAP	7722-76-1	LD50 ¹	>2000 mg/kg bw ²	Rat
Inhalation	MAP	7722-76-1	LC50	>5 mg/L	Rat
Dermal	MAP	7722-76-1	LD50	>5000 mg/kg bw	Rat

Substance C:

Method	Compound	Cas Number	LD50	Subject
Oral	Potassium chloride	7447-40-7	2600 mg/kg	Rat
			1500 mg/kg	Mouse
Dermal	No data are available. Potassium chloride is demonstrated to be of very low acute toxicity by the oral, subcutaneous and intravenous routes in the rat and mouse. Testing for acute dermal toxicity is not justified.			
Inhalation	No data are available. The substance is a non-volatile solid and is produced as crystals with a particle size of >100 µm. There is therefore no potential for inhalation exposure.			
Subcutaneous	Potassium chloride	7447-40-7	2550 mg/kg	Guinea pig
			9.2-10.7 g/kg	Mouse
Method	Compound	Cas Number	LD50	Subject
Intravenous	Potassium chloride	7447-40-7	142 mg/kg	Rat
			117 mg/kg	Mouse

Substance D:

Method	Compound	Cas Number	LD50	Subject
Oral	Potassium sulphate	7778-80-5	>2000 mg/kg	Rat
			6600 mg/kg	Mouse
Inhalation	Potassium sulphate	7778-80-5	3.6 mg/m ³	Rat
Dermal	Potassium sulphate	7778-80-5	>2000mg/kg	Rat

Substance E:

Method	Compound	Cas Number	Measure	Value	Subject
Oral	Boronate (represented by Boric Acid)	10043-35-3	LD50 ¹	3450 mg/kg ⁴	Rat
Inhalation	Boronate (represented by Boric Acid)	10043-35-3	LD50	2.03 mg/m ³	Rat
Dermal	Boronate (represented by Boric Acid)	10043-35-3	LD50	>2000mg/kg	Rat

Substance F:

Method	Compound	Cas Number	Measure	Value	Subject
Oral	Zinc Oxide	1314-13-2	LD50 ¹	>5000 mg/kg bw ²	Rat
Inhalation	Zinc Oxide	1314-13-2	LC50	>5.7 mg/L	Rat
Dermal	Zinc Oxide	1314-13-2	LD50	>2000 mg/kg bw	Rat

¹ "LD50" – Lethal Doses. The dosage at which 50% mortality was observed.

² "bw" - body-weight/day

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.) & (EPA. New Zealand Government, n.d.)

11.2 Skin corrosion/irritation

Classification : **No classification**
 Description : **None of the component was classified as skin corrosive/irritant.**
 Subjects : **Humans, Rabbits**

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.3 Serious eye damage/irritation

Classification : **Eye Irritation, Category 2A**
 Description : **Urea Classified as an Eye Irritation, Category 2A. Potassium Chloride is irritating to the eyes but does not cause a classification. MAP and Ammonium Sulphate is not irritating. The mixture is classified, due to the amount of Urea in the mixture.**
 Subjects : **Humans, Rabbits**

Reference: (ECHA, n.d.) & (EPA. New Zealand Government, n.d.) & (Pubchem, search, n.d.)

11.4 Respiratory or skin sensitisation

Classification : **No classification**
 Description : **None of the component was classified as skin corrosive/irritant.**

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.5 Germ cell mutagenicity

- : **No classification**
- : **None of the component was classified as skin corrosive/irritant.**

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.6 Carcinogenicity

- : **No classification**
- : **None of the component was classified as skin corrosive/irritant.**
- : **Rat and Mouse**

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.7 Reproductive toxicity

- Classification : **Rep. Tox. Cat1**
- Description : **Boric acid as classified and makes up more than 0.1% of mixture.**
- Subject : **Rat**

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.8 STOT² - single exposure

No data available

² "STOT" - Specific target organ toxicity.

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.9 STOT² - repeated exposure

No data available

² "STOT" - Specific target organ toxicity.

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.10 Aspiration hazard

No data available

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

11.11 Route of Exposure and potential effects

- Swallowing : **Convulsions. Headache. Nausea. Vomiting.**
- Inhalation : **Cough. Shortness of breath. Sore throat**
- Eye exposure : **Redness**
- Skin exposure : **Redness**

Reference: (ECHA, n.d.) & (Pubchem, search, n.d. / Referencing ILO)

11.12 Long- and short-term effects

No data available

Reference: (ECHA, n.d.)

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Classification : **Zinc Oxide is classified as (H400 + H410) Hazardous to the aquatic environment, long-term hazard, Category 1, Class 9**

Of all the substances only Zinc Oxide was classified

Aquatic Toxicity :

Substance A:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Urea	57-13-6	Fish	Danio	96-h	LC50 ¹	21 060 mg/L
Urea	57-13-6	Fish	Mozambique Tilapia	28-d	EC10 ³	7 250 mg/L
Urea	57-13-6	Aquatic invertebrates	Daphnia	24-h	EC50 ¹	>10 000 mg/L
Urea	57-13-6	Aquatic invertebrates	Daphnia	21-d	EC10 ³	141 mg/L
Urea	57-13-6	Aquatic Algae and Cyanobacteria	Green alga	92-h	EC50 ¹	24 542 mg/L
				72-h	EC10 ³	6 896 mg/L
Urea	57-13-6	microorganisms	Pseudomonas putida	72-h	EC50 ¹	>10 000 mg/L

Substance B:

Compound	Cas Number	Organism	Species	Time	Measure	Value
MAP	7722-76-1	Fish	Rainbow trout	96-h	LC50 ¹	>100 mg/L
MAP	7722-76-1	Aquatic invertebrates	Daphnia Carinata	48-h	EC50 ₁	>100 mg/L
MAP	7722-76-1	Aquatic Algae and Cyanobacteria	Desmodesmus Subspicatus	72-h	EC50 ¹	>100 mg/L
MAP	7722-76-1	Micro-organisms	Activated sludge of a predominantly domestic sewage	3-h	EC50	>100 mg/L

Substance C:

Compound	Cas Number	Organism	Species	Time	Measure	Value
KCl	7447-40-7	Fish	Pimephales promelas	96-h	LC50 ¹	880 mg/L
KCl	7447-40-7	Fish	Pimephales promelas	28-d	EC10 ³	N/A
KCl	7447-40-7	Aquatic invertebrates	Daphnia magna	24-h	EC50 ¹	660 mg/L
KCl	7447-40-7	Aquatic Algae and Cyanobacteria	Scenedesmus subspicatus	72-h	EC10 ³	100 mg/L
KCl	7447-40-7	Microorganisms	-	3-h	EC50 ¹	1000 mg/L

Substance D:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Potassium sulphate	7778-80-5	Fish	Fathead minnow fish	96-h	LC50 ¹ ₃	680 mg/L
Potassium sulphate	7778-80-5	Aquatic invertebrates	Daphnia magna	48-h	EC50	720 mg/L
Potassium sulphate	7778-80-5	Aquatic Algae and Cyanobacteria	freshwater algae	72-h	EC50	2700 mg/L
Potassium sulphate	7778-80-5	Microorganisms	-	3-h	EC50 ¹	100 mg/L

Substance E:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Boronate (represented by Boric Acid)	10043-35-3	Fish	Fathead minnow fish	96-h	LC50 ¹	79.7 mg/L
		Fish	Pimephales promelas	32-d	NOEC ³	11.2 mg/L
Boronate (represented by Boric Acid)	10043-35-3	Aquatic invertebrates	marine shrimp	48-h	EC50	130 mg/L
			Americamysis bahia		NOEC	33.1 mg/L
Boronate (represented by Boric Acid)	10043-35-3	Aquatic Algae and Cyanobacteria	Pseudokirchneriella subcapitata	Unknown	EC50	52.4 mg/L
Boronate (represented by Boric Acid)	10043-35-3	Microorganisms	Opercularia bimarginata-	Unknown	NOEC	10 mg/L

Substance F:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Zinc Oxide	1314-13-2	Fish	Oncorhynchus Mykiss	96-h	LC50 ¹	0.169 mg/L
Zinc Oxide	1314-13-2	Fish	Unknown	Unknown	NOEC ³	0.044 mg/L
Zinc Oxide	1314-13-2	Aquatic invertebrates	Daphnia magna	24-h	EC50 ¹	660 mg/L
Zinc Oxide	1314-13-2	Aquatic invertebrates	Daphnia magna	21-d	EC10 ³	N/A
Zinc Oxide	1314-13-2	Aquatic Algae and Cyanobacteria	Scenedesmus subspicatus	72-h	EC10 ³	100 mg/L
Zinc Oxide	1314-13-2	Microorganisms	-	3-h	EC50 ¹	1000 mg/L

Terrestrial Toxicity

:

Substance A:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Urea	57-13-6	Micro-organisms	-	24-d	NOEC ²	> 2358 mg urea/kg dw
Urea	57-13-6	Macro-organisms	Earthworms	14-d	LC50 ¹	2 000 mg/kg soil dw
Urea	57-13-6	Macro-organisms	Earthworms	60-d	EC10 ³	160 mg/kg soil dw
Urea	57-13-6	Anthropoids	Collembola, Mites, bees	36-w	NOED ²	640 mg/kg soil dw
Urea	57-13-6	Terrestrial plants	Mono and Dicots	7-d	EC10 ³	1 000 mg/kg soil dw
Urea	57-13-6	Above-ground organisms	amphibians	96-h	LC50 ¹	> 482 kg/ha
Urea	57-13-6	Above-ground organisms	Various mammals (39 different groups/species)	-	NOEC ²	> 1 600 kg/ha
Urea	57-13-6	Above-ground organisms	Ruminants, Cattle, Sheep	24-h	LD0 ⁴	1 000 mg/kg bw
Urea	57-13-6	Above-ground organisms	Cattle	56-d	LD0 ⁴	600 mg/kg bw
Urea	57-13-6	Above-ground organisms	Ruminants, Deer, Moose	-	LD0 ⁴	500 mg/kg bw

Substance E:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Boronate (represented by Boric Acid)	10043-35-3	Macro-organisms	9 Species	24-d	NOEC	5.2 – 315 mg/kg dw
Boronate (represented by Boric Acid)	10043-35-3	Anthropoids	Folsomia candida	28-d	LC50	27.8 mg/kg soil dw
Boronate (represented by Boric Acid)	10043-35-3	Terrestrial plants	Unknown	Unknown	NOEC	3 - 84 mg/kg soil dw
Boronate (represented by Boric Acid)	10043-35-3	Above-ground organisms	Unknown	Unknown	NOEC	3 – 419mg kg/ soil dw

Substance F:

Compound	Cas Number	Organism	Species	Time	Measure	Value
Zinc Oxide	1314-13-2	Micro-organisms	6 Different Species	Unknown	NOEC ²	35.7-1634 mg/kg dw
Zinc Oxide	1314-13-2	Anthropoids	2 Different Species	Unknown	NOED ¹	14.6-1000 mg/kg dw
Zinc Oxide	1314-13-2	Terrestrial plants	18 Different Species	Unknown	NOEC ³	32-5855 mg/kg dw
Zinc Oxide	1314-13-2	Micro-organisms	Unknown	Unknown	NOEC ¹	17-2623 mg/kg dw
Zinc Oxide	1314-13-2	Birds				Not Relevant

A basic assumption made in this hazard assessment and throughout this CSR, (in accordance to the same assumption made in the EU RA process) is that the ecotoxicity of zinc and zinc compounds is due to the Zn⁺⁺ion. As a consequence, all aquatic, sediment and terrestrial toxicity data in this report are expressed as “zinc”, not as the test compound as such, because ionic zinc is considered to be the causative factor for toxicity. A further consequence of this is that all ecotoxicity data obtained on different zinc compounds, are mutually relevant for each other.

Terrestrial toxicity was not warranted on MAP, K₂SO₄ and KCl.

¹ “LC50 /EC50” - (Median Lethal Concentration/Median Effective Concentration) They are the concentrations at which 50% mortality or inhibition of a function (e.g., growth or growth rate) was observed.

² “NOEC” - No Observed Effect Concentration. NOEC is the highest tested concentration for which there are no statistically significant difference of effect when compared to the control group.

³ “ECx” - It is the concentrations at which x % (10% for EC10) effect was observed or derived statistically when compared to the control group.

Reference: (ECHA, n.d.) & (Pubchem, search, n.d.)

12.2 Persistence and degradability

Stability : **Non of the components hydrolyse nor is there evidence for photodegradation.**

Biodegradation **Readily biodegradation study does not need to be conducted since the substance is inorganic.**

Reference: (ECHA, n.d.)

12.3 Bioaccumulate potential

Description : **The study does not need to be conducted as the substance as an inorganic salt has a low potential for adsorption.**

Reference: (ECHA, n.d.)

12.4 Mobility in soil

Adsorption : **Simple inorganic salts with high aqueous solubility will exist in a dissociated form in an aqueous solution. Such a substance has a low potential for adsorption.**

Volatilization : **No data available**

Reference: (ECHA, n.d.)

12.5 Other adverse effects

Classification : **No data available**

SECTION 13: DISPOSAL CONSIDERATIONS

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. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: TRANSPORT INFORMATION

12.1 UN Modelled regulations

UN Number	:	No classification
UN proper shipping name	:	No classification
Transport hazard class(es)	:	No classification
Label	:	No classification
Packing group	:	No classification
Environmentally hazardous	:	No classification
Special precautions:	:	ADR/RID¹ - Not classified
		IMDG² - Not classified
		IATA³ - Not classified
Transport in Bulk according to IMO instructions	:	Not specified

Reference: (Hazmat Tool. n.d.) & (BAM. 2021)

¹ ADR/RID - International Carriage of Dangerous Goods by Rail (RID) and by Road (ADR)

² IMDG - The International Maritime Dangerous Goods (IMDG)

³ IATA - International Air Transport Association (IATA)

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health, and environmental regulations specific for the substance or mixture

Regulations	:	This Safety Data Sheet conforms to the requirements set by the Department of Agriculture, Land reform and Rural development of the Republic of South Africa, United Nations GHS (Rev 9E) (2021) and SANS 10234:2019, on the 29 March 2022.
Restrictions	:	The substance is not subjected to any prohibitions or restriction in South Africa.
Chemical Safety Assessment:	:	For this product a chemical safety assessment was not carried out.

SECTION 16: OTHER INFORMATION

16.1 Preparation and revision

Latest Version

Version Number	: Ver. 3
Preparation Date	: 25 August 2022
Where the changes as made	: Complete overall of all data to comply with GHS regulations

Previous Version

Version Number	: Ver. 2
Preparation date	: February 2021

16.2 Abbreviations and Acronyms

GHS	: Globally Harmonized System of Classification and Labelling of Chemicals
ECHA	: European Chemical agency
AICIS	: The Australian Industrial Chemicals Introduction Scheme
EPA-NZ	: Environmental protection agency New Zealand
ILO (WHO)	: International labour organization (World health organization)
CAS Number	: CAS Number is a numerical designation for chemicals that is maintained by the Chemical Abstracts Service (CAS) of the American Chemical Society.
EC Number	: The European Community number (EC number) is a unique identifier that was assigned to substances for regulatory purposes within the European Union by the European Commission.
H-Statement	: Hazard Statement
P-Statement	: Precautionary Statements
Hazard Statements	: H319 - Causes serious eye irritation
Precautionary Statements	: P264 - Wash hands [and ...] thoroughly after handling.
	: P265 - Do not touch eyes.
	: P280 - Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
N/A	: Not Applicable
Not Classified	: Data conclusive but not at sufficient levels for classification
PPE	: Personal precautions, protective equipment.
TWA	: Time Weighted Average
OEL	: Occupational Exposure Limits
STOT	: Specific target organ toxicity
LC50 / EC50	: (Median Lethal Concentration/Median Effective Concentration): They are the concentrations at which 50% mortality or inhibition of a function (e.g., growth or growth rate) was observed.
NOEC	: (No Observed Effect Concentration) NOEC is the highest tested concentration for which there are no statistically significant difference of effect when compared to the control group
ECx	: It is the concentrations at which x % (10% for EC10) effect was observed or derived statistically when compared to the control group
LD0	: Lethal Dose 0, represents the dose at which no individuals are expected to die.
LC0	: Lethal concentration 0, represents the concentration at which no individuals are expected to die.
LDLo	: Lethal dose low, is the lowest dosage of a compound that is introduced to the human body or that of an animal by any means apart from inhalation that will cause the death of the individual.

16.3 References

BAM. (2021) Dangerous Goods Database. Retrieved From <https://www.dgg.bam.de/quickinfo/en/show/>

(The BAM offers with the expert portal TES information and service concerning the transport and packaging of dangerous substances and goods as well as explosives act)

BAUA. (2016). Technical Rule for Hazardous Substances. TRGS 510 Storage of hazardous substances in non-stationary containers. Retrieved from <https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/>

(The German Federal Institute for Occupational Safety and Health offers selected publications in English. Baua's research aims to ensure a safe and healthy working environment that is adapted to the needs of humans.)

Environmental protection agency [EPA]. New Zealand Government. (n.d.) Database search. *Chemical Classification and Information Database (CCID)*. Retrieved from <https://www.epa.govt.nz/search/SearchForm?>

(EPA-Environmental protection agency. EPA is the government agency responsible for regulating activities that affect Aotearoa New Zealand's environment.)

European Chemicals Agency [ECHA]. (n.d.) Information on Chemicals. Retrieved from <https://echa.europa.eu/registration-dossier/-/registered-dossier/>

(ECHA - European Chemicals Agency. The European Chemicals Agency, is an agency of the EU. They implement the EU's chemicals legislation to protect your health and the environment. Their work also contributes to a well-functioning internal market, innovation, and the competitiveness of Europe's chemicals industry.)

Hazmat Tool. (n.d.) Load, Transport and Storage of Hazardous Materials according U.S-Hazardous Materials Regulations (49 CFR). Retrieved from <https://www.hazmattool.com/>

(Hazmat Tool is a free to search database with information regarding the 49CRF classification and transport)

International Labour organization [ILO]. (n.d.) ICSC database. *International Chemical Safety Cards (ICSCs)*. Retrieved from <https://www.ilo.org/dyn/icsc/>

(ILO-International Labour organization. ILO is a specialized agency of the United Nations. The database data was prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission. © ILO and WHO 2021.)

OECD. (n.d.) The Global Portal to Information on Chemical Substances. Classification Search. Retrieved from <https://www.echemportal.org/echemportal/ghs-search/>

(OECD allow the search by chemical and provides a list and access to compiled SDS's)

Pubchem, search. (n.d.) Explore Chemistry. *Quickly find chemical information from authoritative sources*. Retrieved from <https://pubchem.ncbi.nlm.nih.gov/compound/>

(PubChem is an open chemistry database at the National Institutes of Health (NIH). Pubchem may reference some of the same sources as listed in this document)

Pubchem, GHS. (n.d.) Explore Chemistry. *GHS Classification*. Retrieved from <https://pubchem.ncbi.nlm.nih.gov/ghs/>

(PubChem is an open chemistry database at the National Institutes of Health (NIH). Pubchem may reference some of the same sources as listed in this document)

South African Labour Department. (2021) Regulations for Hazardous Chemical Agents. Retrieved from https://www.gov.za/sites/default/files/gcis_document/202103/44348rg11263gon280.pdf

(The Minister of Employment and Labour has, under section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), after consultation with the Advisory Council for Occupational Health and Safety, made the regulations in the Schedule)

The Australian Industrial Chemicals Introduction Scheme [AICIS]. (n.d.) Chemical information. *Search assessments*. Retrieved from <https://www.industrialchemicals.gov.au/chemical-information/search-assessments?assessmentcasnumber>

(The Australian Industrial Chemicals Introduction Scheme (AICIS) helps protect Australians and the environment by assessing the risks of industrial chemicals and providing information to promote their safe use. Focus mainly on health aspects.)

16.4 Disclaimer

The information contained in this SDS does not constitute a risk assessment, and should not replace the user's own assessment of risks as required by other health and safety legislation.

This SDS summarises at the date of issue our best knowledge of the health, safety and environmental hazard information related to the product and in particular how to safely handle, use, store and transport the product. Since Kynoch cannot anticipate or control the conditions under which the product may be handled, used, stored, or transported, each user must, prior to usage, review this SDS in the context of how the user intends to handle, use, store or transport the product and beyond, and communicate such information to all relevant parties.

We shall not assume any liability for the accuracy or completeness of the information contained herein or any advice given unless there has been gross negligence on our part.