



Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8
Issue date: 12/6/2022 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the supplier/undertaking

1.1. GHS product identifier

Product form	: Mixture
Trade name	: Puzzle 50 EC (Pinoxaden + safener 50 g/l)
Type of product	: Herbicide
CAS-No.	: 243973-20-8
Product group	: End product

1.2. Other means of identification

No additional information available

1.3. Recommended use of the chemical and restrictions on use

An emulsifiable concentrate herbicide for the selective post-emergence control of annual grasses in wheat and barley in the Western and Southern Cape and in dry land and irrigated areas of the summer rainfall region.

1.4. Supplier's details

Supplier

Farm-Ag International (Pty) Ltd
Old Mill Industrial Park
61, Marshall Drive
P.O. Box 1523
4300 Mount Edgecombe – Durban KwaZulu Natal
South Africa
T 031 003 3486

1.5. Emergency phone number

Emergency number	: 24 Hr Emergency Number: In case of Poisoning: Poison Information Helpline : 0861 555 777
	In case of Spillage: HAZMAT:0800 147 112

SECTION 2: Hazard identification

2.1. GHS classification of the substance/mixture and any national or regional information

Classification according to the United Nations GHS

Flammable liquids	Not classified	
Acute toxicity (inhalation:vapour)	Category 4	H332
Serious eye damage/eye irritation,	Category 2	H319
Skin sensitisation,	Category 1	H317
Specific target organ toxicity – Repeated exposure,	Category 2	H373
Hazardous to the aquatic environment – Acute Hazard,	Category 3	H402
Hazardous to the aquatic environment – Chronic Hazard,	Category 2	H411
Full text of H-statements:	see section 16	
Adverse physicochemical, human health and environmental effects		: May cause damage to organs through prolonged or repeated exposure,Harmful if inhaled,May cause an allergic skin reaction,Causes serious eye irritation,Harmful to aquatic life,Toxic to aquatic life with long lasting effects.

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

2.2. GHS label elements, including precautionary statements

Labelling according to the United Nations GHS

Hazard pictograms (GHS ZA) :



Signal word (GHS-ZA) :

Warning

Hazardous ingredients :

Pinoxaden 97% TC, calcium dodecylbenzenesulphonate, Cyclohexanone, Solvent Naphtha

Hazard statements (GHS ZA) :

H317 - May cause an allergic skin reaction

H319 - Causes serious eye irritation

H332 - Harmful if inhaled

H373 - May cause damage to organs through prolonged or repeated exposure

H402 - Harmful to aquatic life

H411 - Toxic to aquatic life with long lasting effects

Precautionary statements (GHS ZA) :

P101 - If medical advice is needed, have product container or label at hand.

P102 - Keep out of reach of children.

P103 - Read carefully and follow all instructions.

P261 - Avoid breathing vapours.

P264 - Wash hands, forearms and face thoroughly after handling.

P271 - Use only outdoors or in a well-ventilated area.

P272 - Contaminated work clothing should not be allowed out of the workplace.

P273 - Avoid release to the environment.

P280 - Wear protective clothing, eye protection, face protection.

P302+P352 - IF ON SKIN: Wash with plenty of soap and water

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P312 - Call a doctor if you feel unwell.

P314 - Get medical advice/attention if you feel unwell

P333+P313 - If skin irritation or rash occurs: Get medical advice/attention

P337+P313 - If eye irritation persists: Get medical advice/attention

P362+P364 - Take off contaminated clothing and wash it before reuse.

P391 - Collect spillage.

P501 - Dispose of container to an approved waste disposal plant.

SECTION 3: Composition/information on ingredients

3.1. Mixture

Name	Product identifier	%	Classification according to the United Nations GHS
Solvent Naphtha	CAS-No.: 64742-94-5	≥ 45 – < 50	Flam. Liq. 3, H226 Eye Irrit. 2A, H319 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 2, H411
Cyclohexanone	CAS-No.: 108-94-1	≥ 20 – < 25	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation:vapour), H332
calcium dodecylbenzenesulphonate	CAS-No.: 26264-06-2	≥ 5 – < 10	Acute Tox. 4 (Oral), H302 STOT RE 2, H373 Aquatic Chronic 3, H412
Pinoxaden 97% TC	CAS-No.: 243973-20-8	≥ 5 – < 10	Eye Irrit. 2, H319 Skin Sens. 1A, H317 STOT SE 3, H335 Aquatic Acute 1, H400 Aquatic Chronic 3, H412

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Name	Product identifier	%	Classification according to the United Nations GHS
Castor oil polyoxyethylene ether	CAS-No.: 61791-12-6	≥ 1 – < 5	Flam. Liq. Not classified Eye Irrit. 2A, H319
cloquintocet-mexyl	CAS-No.: 99607-70-2	≥ 1 – < 5	Acute Tox. 3 (Inhalation:dust,mist), H331 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

SECTION 4: First aid measures

4.1. Description of necessary first aid measures

First-aid measures general	: Call a poison center or a doctor if you feel unwell.
First-aid measures after inhalation	: Move the victim to fresh air. If breathing is irregular or stopped, administer artificial respiration. Keep patient warm and at rest. Call a physician or poison control centre immediately.
First-aid measures after skin contact	: Wash skin with plenty of water. Take off contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures after eye contact	: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	: Call a poison center or a doctor if you feel unwell.

4.2. Most important symptoms/effect, acute and delayed

Symptoms/effects	: Aspiration may cause pulmonary oedema and pneumonitis.
Symptoms/effects after inhalation	: Harmful if inhaled.
Symptoms/effects after skin contact	: May cause an allergic skin reaction.
Symptoms/effects after eye contact	: Causes serious eye irritation.

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

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	: Water spray. Dry powder. Foam. Carbon dioxide.
Unsuitable extinguishing media	: Water spray as a fog can be used for cooling of unaffected stock, but avoid water coming in contact with the product. Contain water used for fire-fighting for later disposal. Avoid the accumulation of polluted run-off from the site.

5.2. Specific hazards arising from the chemical

Hazardous decomposition products in case of fire	: Toxic fumes may be released.
--	--------------------------------

5.3. Special protective actions for fire-fighters

Firefighting instructions	: Remove spectators from surrounding area. Isolate the fire area and evacuate downwind. Use a recommended extinguishing agent for the type of surrounding fire. Fight fire from maximum distance and use unmanned hose holder or monitor nozzles. Contain fire control agents for later disposal. Avoid inhaling hazardous vapours and fumes from burning materials. Keep upwind. Remove container from fire area if possible and without risk. Water can be used to cool unaffected containers but must be contained for later disposal. Dyke fire control water for later disposal. Do not scatter the material. Avoid pollution of waterways. Do not use high volume water jet, due to contamination risk. Contain water used for fire fighting for later disposal. Avoid the accumulation of polluted run-off from the site.
Protection during firefighting	: Fire may produce irritating or poisonous vapours (toxic compounds of carbon, nitrogen and chlorine), mists or other products of combustion. Fire fighters and others that may be exposed should wear full protectiveclothing and self-contained breathing apparatus.

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Personal protection (Emergency response) : Wear respiratory protection, Wear protective gloves, Wear protective clothing, Wear eye protection, Wear a face shield



SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Ventilate spillage area. Do not breathe vapours. Avoid contact with skin and eyes.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Do not allow entering drains or watercourses. Spillage or uncontrolled discharges into water courses (or public waters) to be reported immediately to the Police and to the Department of Water/Environmental Affairs.

6.3. Methods and materials for containment and cleaning up

For containment : Collect spillage.
Methods for cleaning up : For small liquid spills, soak up with lime, damp earth or sand, or other non-combustible absorbent material and place into containers for later disposal. For large liquid spills, contain the liquid for later disposal. In situations where product comes in contact with water, contain contaminated water for later disposal. Do not flush spilled material into drains. Keep spectators away.
Other information : Dispose of materials or solid residues at an authorized site.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Harmful if swallowed. This product may be irritating to eyes and skin. Avoid contact with eyes and skin, and inhalation of dust, spray and vapour. Use with adequate ventilation. Wash hands before eating, drinking, chewing gum, smoking, or using the toilet. Remove clothing immediately if the product gets inside. Then wash skin thoroughly using a non-abrasive soap and put on clean clothing. Do not apply directly to areas where surface water is present, or to intertidal areas below the mean high water mark. Water used to clean equipment must be disposed of correctly to avoid contamination.
Hygiene measures : Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a well-ventilated place. Keep cool.
Storage area : Keep only in the original container. Keep out of direct sunlight. Store in a dry area.
Information on mixed storage : KEEP SUBSTANCE AWAY FROM: Food supplies. Water supplies.
Maximum storage period : 2 years
Storage temperature : ≤ 35 °C

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Cyclohexanone (108-94-1)

South Africa - Occupational Exposure Limits (Restricted Limits)

Local name	Cyclohexanone
OEL eight hour TWA [ppm]	100 ppm
RHCA - STEL/C [ppm]	40 ppm
Remark	SKIN (danger of cutaneous absorption)
Regulatory reference	Government Notice No. R. 280, 2021

South Africa - Occupational Exposure Limits (Airborne Pollutants)

Local name	Cyclohexanone
OEL TWA	100 mg/m ³
OEL TWA [ppm]	25 ppm
OEL STEL	200 mg/m ³
OEL STEL [ppm]	50 ppm
Regulatory reference	Government Notice No. R 904

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station.
Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures, such as personal protective equipment

Hand protection : Protective gloves
Eye protection : Safety glasses
Skin and body protection : Wear suitable protective clothing
Respiratory protection : In case of inadequate ventilation wear respiratory protection.

Personal protective equipment symbol(s)



8.4. Exposure limit values for the other components

No additional information available

SECTION 9: Physical and chemical properties

9.1. Basic physical and chemical properties

Physical state : Liquid
Appearance : Clear liquid.
Colour : Light yellow to orange brown.
Odour : Sweet odour.
Odour threshold : No data available
pH : 4.5
pH solution : No data available
Relative evaporation rate (butylacetate=1) : No data available
Relative evaporation rate (ether=1) : No data available
Melting point : Not applicable
Freezing point : No data available
Boiling point : No data available
Flash point : 103 °C
Auto-ignition temperature : No data available
Decomposition temperature : No data available

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Flammability	: Non flammable.
Vapour pressure	: No data available
Vapour pressure at 50°C	: No data available
Relative vapour density at 20°C	: No data available
Relative density	: 0.965
Relative density of saturated gas/air mixture	: No data available
Density	: No data available
Relative gas density	: No data available
Solubility	: No data available
Partition coefficient n-octanol/water (Log Pow)	: No data available
Partition coefficient n-octanol/water (Log Kow)	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available
Lower explosion limit	: No data available
Upper explosion limit	: No data available
Physical state	: Liquid
Appearance	: Clear liquid.

SECTION 10: Stability and Reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical Stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

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 (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Harmful if inhaled.

Puzzle 50 EC (Pinoxaden + safener 50 g/l) (243973-20-8)

ATE ZA (vapours)	15.95 mg/l/4h
Unknown acute toxicity (GHS ZA)Unknown acute toxicity (GHS ZA)	61.11% of the mixture consists of ingredient(s) of unknown acute toxicity (Oral) 90% of the mixture consists of ingredient(s) of unknown acute toxicity (Dermal) 67.78% of the mixture consists of ingredient(s) of unknown acute toxicity (Inhalation (Vapours))

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Pinoxaden 97% TC (243973-20-8)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rat	> 2000 mg/kg bodyweight (OECD 402: Acute Dermal Toxicity, Rat, Male / female, Experimental value, Dermal)
LC50 Inhalation - Rat (Dust/Mist)	4.63 – 6.24 mg/l/4h
cloquintocet-mexyl (99607-70-2)	
LD50 oral rat	> 5000 mg/kg Rats
LD50 oral	> 2000 mg/kg Mice
LD50 dermal rat	> 2000 mg/kg bodyweight (OECD 402: Acute Dermal Toxicity, 24 h, Rat, Male / female, Experimental value, Dermal, 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	> 0.935 mg/l/4h
Castor oil polyoxyethylene ether (61791-12-6)	
LD50 oral rat	> 2000 mg/kg bodyweight (Rat, Male, Oral)
LD50 dermal rat	> 2000 mg/kg bodyweight (OECD 402: Acute Dermal Toxicity, 24 h, Rat, Male / female, Experimental value, Dermal, 14 day(s))
calcium dodecylbenzenesulphonate (26264-06-2)	
LD50 oral rat	1300 mg/kg bodyweight Animal: rat, Guideline: other:
LD50 dermal rat	> 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity), Remarks on results: other:
Cyclohexanone (108-94-1)	
LD50 oral rat	1890 – 2650 mg/kg bodyweight (BASF test, Rat, Experimental value, Oral, 7 day(s))
LC50 Inhalation - Rat	> 6.2 mg/l air (BASF test, 4 h, Rat, Male / female, Experimental value, Inhalation (vapours))
Solvent Naphtha (64742-94-5)	
LD50 oral rat	> 5000 mg/kg bodyweight Animal: rat, Guideline: EPA OTS 798.1175 (Acute Oral Toxicity)
LD50 dermal rabbit	> 2000 mg/kg bodyweight Animal: rabbit, Guideline: EPA OTS 798.1100 (Acute Dermal Toxicity)
Skin corrosion/irritation	: Not classified pH: 4.5
Serious eye damage/irritation	: Causes serious eye irritation. pH: 4.5
calcium dodecylbenzenesulphonate (26264-06-2)	
Additional information	100 mg/24 h Moderate
Respiratory or skin sensitisation	: May cause an allergic skin reaction.
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: Not classified
Pinoxaden 97% TC (243973-20-8)	
STOT-single exposure	May cause respiratory irritation.
STOT-repeated exposure	: May cause damage to organs through prolonged or repeated exposure.
calcium dodecylbenzenesulphonate (26264-06-2)	
LOAEL (oral, rat, 90 days)	200 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
LOAEL (dermal, rat/rabbit, 90 days)	286 mg/kg bodyweight Animal: rat, Animal sex: male

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

calcium dodecylbenzenesulphonate (26264-06-2)	
NOAEL (oral, rat, 90 days)	100 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
NOAEL (dermal, rat/rabbit, 90 days)	< 286 mg/kg bodyweight Animal: rat, Animal sex: male
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.

Solvent Naphtha (64742-94-5)	
LOAEL (oral, rat, 90 days)	1250 mg/kg bodyweight Animal: rat, Guideline: EU Method B.26 (Sub-Chronic Oral Toxicity Test: Repeated Dose 90-Day Oral Toxicity Study in Rodents)
LOAEL (dermal, rat/rabbit, 90 days)	200 mg/kg bodyweight Animal: rabbit, Guideline: OECD Guideline 410 (Repeated Dose Dermal Toxicity: 21/28-Day Study)
LOAEC (inhalation, rat, vapour, 90 days)	4.71 mg/l air Animal: rat, Guideline: EU Method B.29 (Sub-Chronic Inhalation Toxicity:90-Day Study)
NOAEL (oral, rat, 90 days)	625 mg/kg bodyweight Animal: rat, Guideline: EU Method B.26 (Sub-Chronic Oral Toxicity Test: Repeated Dose 90-Day Oral Toxicity Study in Rodents)
NOAEL (dermal, rat/rabbit, 90 days)	2000 mg/kg bodyweight Animal: rabbit, Animal sex: male, Guideline: OECD Guideline 410 (Repeated Dose Dermal Toxicity: 21/28-Day Study)
NOAEC (inhalation, rat, vapour, 90 days)	2355 mg/l air Animal: rat, Guideline: EU Method B.29 (Sub-Chronic Inhalation Toxicity:90-Day Study)
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Harmful to aquatic life. Toxic to aquatic life with long lasting effects.
Hazardous to the aquatic environment, short-term (acute) : Harmful to aquatic life.
Hazardous to the aquatic environment, long-term (chronic) : Toxic to aquatic life with long lasting effects.

Pinoxaden 97% TC (243973-20-8)	
LC50 - Fish [1]	10.3 mg/l (OECD 203: Fish, Acute Toxicity Test, 96 h, Oncorhynchus mykiss, Flow-through system, Experimental value)
LC50 - Fish [2]	20 mg/l Fathead minnows
LC50 - Other aquatic organisms [1]	52 mg/l
LC50 - Other aquatic organisms [2]	> 0.88 mg/l eastern oysters
EC50 - Crustacea [1]	52 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Flow-through system, Experimental value)
ErC50 algae	14 mg/l Navicula pelliculosa
Additional data	BIRDS: Acute oral LD50 for bobwhite quail > 2250 mg/kg diet. Dietary LC50 (5d) for bobwhite quail and mallard ducks >5620 mg/kg diet. BEES: (LD50, ug/bee) >100 (contact); >200 (oral). WORMS: LC50 (14d) for Eisenia fetida > 1000 mg/kg soil.

cloquintocet-mexyl (99607-70-2)	
LC50 - Fish [1]	> 76 mg/l Rainbow trout
LC50 - Fish [2]	> 51 mg/l Bluegill sunfish
EC50 - Crustacea [1]	> 0.82 mg/l
EC50 96h - Algae [1]	0.63 mg/l Scenedesmus subspicatus

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

cloquintocet-mexyl (99607-70-2)	
EC50 96h - Algae [2]	1.7 mg/l Navicula
Additional data	Birds: Acute oral LD50 for mallard ducks and bobwhite quail >2000 mg/kg. Bees: (LD50, ug/bee) >100 (oral and contact) (48h). Worms LC50 for earthworms >1000 mg/kg soil
Castor oil polyoxyethylene ether (61791-12-6)	
LC50 - Fish [1]	> 45 mg/l (OECD 203: Fish, Acute Toxicity Test, 96 h, Danio rerio, Static system, Fresh water, Experimental value)
ErC50 algae	> 93 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Desmodesmus subspicatus, Fresh water, Experimental value)
calcium dodecylbenzenesulphonate (26264-06-2)	
LC50 - Fish [1]	1.74 mg/l Test organisms (species): other:
EC50 96h - Algae [1]	2736 mg/l Test organisms (species): other:
NOEC (chronic)	0.253 mg/l Test organisms (species): other: Duration: '30 d'
NOEC chronic fish	0.23 mg/l Test organisms (species): other: Duration: '30 d'
Cyclohexanone (108-94-1)	
LC50 - Fish [1]	527 – 732 mg/l (US EPA, 96 h, Pimephales promelas, Flow-through system, Fresh water, Experimental value, Lethal)
EC50 - Crustacea [1]	> 100 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value, Behaviour)
ErC50 algae	> 100 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Desmodesmus subspicatus, Static system, Fresh water, Read-across, GLP)
Solvent Naphtha (64742-94-5)	
LC50 - Fish [1]	8.41 mg/l Test organisms (species): Oncorhynchus mykiss (previous name: Salmo gairdneri)
EC50 - Crustacea [1]	4.7 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	12.4 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
EC50 72h - Algae [2]	18.9 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
EC50 96h - Algae [1]	11.7 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
EC50 96h - Algae [2]	18.4 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)

12.2. Persistence and degradability

Puzzle 50 EC (Pinoxaden + safener 50 g/l) (243973-20-8)	
Persistence and degradability	No additional information available
Pinoxaden 97% TC (243973-20-8)	
Persistence and degradability	Not readily biodegradable in water.
cloquintocet-mexyl (99607-70-2)	
Persistence and degradability	Not readily biodegradable in water.
Castor oil polyoxyethylene ether (61791-12-6)	
Persistence and degradability	Readily biodegradable in water.

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Cyclohexanone (108-94-1)

Persistence and degradability	Biodegradable in the soil. Readily biodegradable in water.
Biochemical oxygen demand (BOD)	1.232 g O ₂ /g substance
Chemical oxygen demand (COD)	2.605 g O ₂ /g substance
ThOD	2.605 g O ₂ /g substance

12.3. Bioaccumulative potential

Puzzle 50 EC (Pinoxaden + safener 50 g/l) (243973-20-8)

Bioaccumulative potential	No additional information available
---------------------------	-------------------------------------

Pinoxaden 97% TC (243973-20-8)

Partition coefficient n-octanol/water (Log Kow)	3.2 (Experimental value, EU Method A.8: Partition Coefficient, 25 °C)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

cloquintocet-mexyl (99607-70-2)

BCF - Fish [1]	621 (OECD 305: Bioconcentration: Flow-Through Fish Test, 1 day(s), Lepomis macrochirus, Flow-through system, Fresh water, Experimental value, GLP)
Partition coefficient n-octanol/water (Log Pow)	5.2
Bioaccumulative potential	Potential for bioaccumulation (500 ≤ BCF ≤ 5000).

Castor oil polyoxyethylene ether (61791-12-6)

BCF - Fish [1]	3.162 (BCFBAF v3.00, Pisces, Calculated value)
Partition coefficient n-octanol/water (Log Kow)	1.33 (Experimental value, 23 °C)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

Cyclohexanone (108-94-1)

Partition coefficient n-octanol/water (Log Kow)	0.86 (Experimental value, OECD 107: Partition Coefficient (n-octanol/water): Shake Flask Method, 25 °C)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

12.4. Mobility in soil

Puzzle 50 EC (Pinoxaden + safener 50 g/l) (243973-20-8)

Mobility in soil	No additional information available
------------------	-------------------------------------

Pinoxaden 97% TC (243973-20-8)

Surface tension	46 mN/m (20 °C, EU Method A.5: Surface tension)
Ecology - soil	Low potential for adsorption in soil.

cloquintocet-mexyl (99607-70-2)

Surface tension	57 mN/m (20 °C, 0.59 mg/l, OECD 115: Surface Tension of Aqueous Solutions)
Ecology - soil	Highly mobile in soil.

Castor oil polyoxyethylene ether (61791-12-6)

Surface tension	35.1 mN/m (23 °C)
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	10
Ecology - soil	Low potential for mobility in soil.

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Cyclohexanone (108-94-1)

Surface tension	No data available in the literature
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	1.18
Ecology - soil	Highly mobile in soil.

12.5. Other adverse effects

Ozone : Not classified
Other adverse effects : No additional information available




SECTION 13: Disposal Considerations

13.1. Disposal methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

SECTION 14: Transport information

In accordance with SANS / IMDG / IATA

SANS	IMDG	IATA
14.1. UN number		
3082	3082	3082
14.2. UN Proper Shipping Name		
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains pinoxaden 50 g/l)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains pinoxaden 50 g/l)	Environmentally hazardous substance, liquid, n.o.s. (contains pinoxaden 50 g/l)
14.3. Transport hazard class(es)		
9	9	9
		
14.4. Packing group, if applicable		
III	III	III
14.5. Environmental hazards		
Dangerous for the environment : Yes	Dangerous for the environment : Yes Marine pollutant : Yes	Dangerous for the environment : Yes
No supplementary information available		

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations specific for the product in question

No additional information available

SECTION 16: Other information

Issue date : 06/12/2022

Puzzle 50 EC (Pinoxaden + safener 50 g/l)

Safety Data Sheet

According to Regulations for Hazardous Chemical Agents, 2021 and United Nations GHS revision 8

Safety Data Sheet (SDS), South Africa (HCA)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.