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

1.1 Product identifier

Trade name	Puma S
Product code (UVP)	06396216

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

Use	Herbicide
EPA-Nr.	HSR000409

1.3 Details of the supplier of the safety data sheet

Supplier	Bayer New Zealand Limited 3 Argus Place, Hillcrest Auckland 0627 New Zealand
Telephone	0800 428 246
Telefax	(09) 441 8645

1.4 Emergency telephone no.

Emergency Number	0800 734 607 (24hr)
Global Incident Response Hotline (24h)	+1 (760) 476-3964 (Company 3E for Bayer AG, Crop Science Division)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classified as hazardous according to the criteria in the Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001

6.1E H303	May be harmful if swallowed.
6.3A H315	Causes skin irritation.
6.4A H320	Causes eye irritation.
6.5B H317	May cause an allergic skin reaction.
9.1A H410	Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling in accordance with Hazardous Substances Identification Regulations 2001

Hazard label for supply/use required.

Signal word: Warning

Hazard statements

H303	May be harmful if swallowed.
H315	Causes skin irritation.
H320	Causes eye irritation.
H317	May cause an allergic skin reaction.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements

P102	Keep out of reach of children.
P312	Call a POISON CENTER/doctor/physician if you feel unwell.
P321	Specific treatment (see supplemental first aid instructions on this label).
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P391	Collect spillage.
P501	Dispose of contents/container in accordance with local regulation.

2.3 Other hazards

No other hazards known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Chemical nature

Emulsion, oil in water (EW)
Fenoxaprop-p-ethyl/Mefenpyr-diethyl 69.0:18,8 g/l

Hazardous components

Name	CAS-No.	Conc. [%]
Fenoxaprop-P-ethyl	71283-80-2	6,57
Mefenpyr-diethyl	135590-91-9	1,79
Solvent Naphtha (petroleum), heavy aromatic, <1% naphthalene	64742-94-5	> 25
Alcohols, C11-14-iso-, C13-rich, ethoxylated	78330-21-9	> 1 – < 25
Mixture of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one	55965-84-9	< 0,1
Glycerine	56-81-5	> 1

Further information

Fenoxaprop-P-ethyl	71283-80-2	M-Factor: 1 (acute), 1 (chronic)

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice	Move out of dangerous area. Place and transport victim in stable position (lying sideways). Remove contaminated clothing immediately and dispose of safely.
Inhalation	Move to fresh air. Keep patient warm and at rest. Call a physician or poison control center immediately.
Skin contact	Wash off thoroughly with plenty of soap and water, if available with polyethyleneglycol 400, subsequently rinse with water. If symptoms persist, call a physician.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention if irritation develops and persists.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately. Risk of product entering the lungs on vomiting after ingestion. Rinse mouth.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms	If large amounts are ingested, the following symptoms may occur: Headache, Nausea, Dizziness, Somnolence Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Aspiration may cause pulmonary oedema and pneumonitis. Inhalation may provoke the following symptoms: Cough, Shortness of breath, Cyanosis, Fever Symptoms and hazards refer to the solvent.

4.3 Indication of any immediate medical attention and special treatment needed

Risks	Contains hydrocarbon solvents. May pose an aspiration pneumonia hazard.
Treatment	Treat symptomatically. Gastric lavage is not normally required. However, if a significant amount (more than a mouthful) has been ingested, administer activated charcoal and sodium sulphate. In case of aspiration intubation and bronchial lavage should be considered. Monitor: kidney, liver and pancreas function. There is no specific antidote. Contraindication: derivatives of adrenaline.

Contact the National Poisons and Hazardous Chemicals Information center in Dunedin, PO Box 913, Dunedin. Phone 0800 POISON (0800 764 766).

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable	High volume water jet
5.2 Special hazards arising from the substance or mixture	In the event of fire the following may be released:, Hydrogen chloride (HCl), Hydrogen cyanide (hydrocyanic acid), Carbon monoxide (CO), Nitrogen oxides (NOx)

5.3 Advice for firefighters

Special protective equipment for firefighters	In the event of fire and/or explosion do not breathe fumes. In the event of fire, wear self-contained breathing apparatus.
Further information	Contain the spread of the fire-fighting media. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Precautions	Avoid contact with spilled product or contaminated surfaces. Use personal protective equipment.
6.2 Environmental precautions	Do not allow to get into surface water, drains and ground water.

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Clean contaminated floors and objects thoroughly, observing environmental regulations. Keep in suitable, closed containers for disposal.
6.4 Reference to other sections	Information regarding safe handling, see section 7. Information regarding personal protective equipment, see section 8. Information regarding waste disposal, see section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling	Use only in area provided with appropriate exhaust ventilation.
Hygiene measures	Avoid contact with skin, eyes and clothing. Keep working clothes separately. Wash hands before breaks and immediately after handling the product. Wash hands immediately after work, if necessary take a shower. Remove soiled clothing immediately and clean thoroughly before using again. Garments that cannot be cleaned must be destroyed (burnt).

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	Store in original container. Keep containers tightly closed in a dry, cool and well-ventilated place. Store in a place accessible by authorized persons only. Keep away from direct sunlight. Protect from frost.
Advice on common storage	Keep away from food, drink and animal feedingstuffs.
Suitable materials	Combination of sheet metal and HDPE (high density polyethylene)
7.3 Specific end use(s)	Refer to the label and/or leaflet.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components	CAS-No.	Control parameters	Update	Basis
Fenoxaprop-P-ethyl	71283-80-2	2,6 mg/m3 (TWA)		OES BCS*
Mefenpyr-diethyl	135590-91-9	10 mg/m3 (TWA)		OES BCS*
Solvent Naphtha (petroleum), heavy aromatic, <1% naphthalene	64742-94-5	1.600 mg/m3/400 ppm (TWA)	02 2013	NZ OEL
Glycerine (Mist.)	56-81-5	10 mg/m3 (TWA)	06 2016	NZ OEL

*OES BCS: Internal Bayer AG, Crop Science Division "Occupational Exposure Standard"

8.2 Exposure controls

Personal protective equipment
In normal use and handling conditions please refer to the label and/or leaflet. In all other cases the following recommendations would apply.

Respiratory protection
Respiratory protection is not required under anticipated circumstances of exposure.
Respiratory protection should only be used to control residual risk of short duration activities, when all reasonably practicable steps have been taken to reduce exposure at source e.g. containment and/or local extract ventilation. Always follow respirator manufacturer's instructions regarding wearing and maintenance.

Hand protection
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
Wash gloves when contaminated. Dispose of when contaminated inside, when perforated or when contamination on the outside cannot be removed. Wash hands frequently and always before eating, drinking, smoking or using the toilet.

Material	Nitrile rubber
Rate of permeability	> 480 min
Glove thickness	> 0,4 mm

	Protective index	Class 6
	Directive	Protective gloves complying with EN 374.
Eye protection	Wear goggles (conforming to EN166, Field of Use = 5 or equivalent).	
Skin and body protection	Wear standard coveralls and Category 3 Type 4 suit. If there is a risk of significant exposure, consider a higher protective type suit. Wear two layers of clothing wherever possible. Polyester/cotton or cotton overalls should be worn under chemical protection suit and should be professionally laundered frequently. If chemical protection suit is splashed, sprayed or significantly contaminated, decontaminate as far as possible, then carefully remove and dispose of as advised by manufacturer.	
General protective measures	If product is handled while not enclosed, and if contact may occur: Complete suit protecting against chemicals	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form	Liquid
Colour	white to beige
Odour	aromatic
pH	7,6 - 8,2 at 10 % (23 °C) (deionized water)
Flash point	>100 °C
Auto-ignition temperature	435 °C at 1.008 hPa
Density	ca. 1,05 g/cm³ at 20 °C
Water solubility	emulsifiable
Partition coefficient: n-octanol/water	Fenoxaprop-P-ethyl: log Pow: 4,58 at 30 °C Mefenpyr-diethyl: log Pow: 3,83 at 21 °C reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): log Pow: 0,401
Viscosity, dynamic	600 - 1.200 mPa.s at 20 °C Velocity gradient 20 /s 300 - 800 mPa.s at 20 °C Velocity gradient 100 /s
Viscosity, kinematic	201 mm²/s at 40 °C Shear rate of 100/sec
Surface tension	34 mN/m at 20 °C
Impact sensitivity	Not impact sensitive.
Explosivity	Not explosive 92/69/EEC, A.14 / OECD 113
9.2 Other information	Further safety related physical-chemical data are not known.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Thermal decomposition	> 250 °C, Heating rate: 10 K/min
10.2 Chemical stability	Stable under recommended storage conditions.
10.3 Possibility of hazardous reactions	No hazardous reactions when stored and handled according to prescribed instructions.
10.4 Conditions to avoid	Extremes of temperature and direct sunlight.
10.5 Incompatible materials	Store only in the original container.
10.6 Hazardous decomposition products	No decomposition products expected under normal conditions of use.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute oral toxicity	LD50 (Rat) > 5.000 mg/kg Test conducted with a similar formulation.
Acute inhalation toxicity	LC50 (Rat) > 10,74 mg/l Exposure time: 4 h Highest attainable concentration. Test conducted with a similar formulation.
Acute dermal toxicity	LD50 (Rat) > 4.000 mg/kg Test conducted with a similar formulation.
Skin irritation	Slight irritant effect - does not require labelling. (Rabbit) Test conducted with a similar formulation.
Eye irritation	Slight irritant effect - does not require labelling. (Rabbit) Test conducted with a similar formulation.
Sensitisation	Non-sensitizing. (Guinea pig) OECD Test Guideline 406, Buehler test Test conducted with a similar formulation. Sensitising (Mouse) OECD Test Guideline 429, local lymph node assay (LLNA)

Assessment STOT Specific target organ toxicity – single exposure

Fenoxaprop-P-ethyl: Based on available data, the classification criteria are not met.

Mefenpyr-diethyl: Based on available data, the classification criteria are not met.

reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): Based on available data, the classification criteria are not met.

Assessment STOT Specific target organ toxicity – repeated exposure

Fenoxaprop-P-ethyl did not cause specific target organ toxicity in rats. Fenoxaprop-P-ethyl caused

specific target organ toxicity in experimental animal studies in mice in the following organ(s): Kidney.
Mefenpyr-diethyl did not cause specific target organ toxicity in experimental animal studies.
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): This information is not available.

Assessment mutagenicity

Fenoxaprop-P-ethyl was not mutagenic or genotoxic in a battery of in vitro and in vivo tests.
Mefenpyr-diethyl was not mutagenic or genotoxic in a battery of in vitro and in vivo tests.
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1) is not considered mutagenic.

Assessment carcinogenicity

Fenoxaprop-P-ethyl demonstrated no carcinogenic potential in a lifetime feeding study in rats.
Fenoxaprop-P-ethyl caused an increased incidence of liver tumours in mice at high doses. Fenoxaprop-P-ethyl causes tumours through peroxisome proliferation. The mechanism that triggers tumours in rodents and the type of tumours observed are not relevant to humans.
Mefenpyr-diethyl was not carcinogenic in lifetime feeding studies in rats and mice.
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): Based on available data, the classification criteria are not met.

Assessment toxicity to reproduction

Fenoxaprop-P-ethyl did not cause reproductive toxicity in a two-generation study in rats.
Mefenpyr-diethyl did not cause reproductive toxicity in a two-generation study in rats.
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): Based on available data, the classification criteria are not met.

Assessment developmental toxicity

Fenoxaprop-P-ethyl did not cause developmental toxicity in rats and rabbits.
Mefenpyr-diethyl caused developmental toxicity only at dose levels toxic to the dams. The developmental effects seen with Mefenpyr-diethyl are related to maternal toxicity.
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): Based on available data, the classification criteria are not met.

Aspiration hazard

Based on available data, the classification criteria are not met.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 (Cyprinus carpio (Carp)) 3,8 mg/l Exposure time: 96 h Test conducted with a similar formulation.
Toxicity to aquatic invertebrates	EC50 (Daphnia magna (Water flea)) 3 mg/l Exposure time: 48 h Test conducted with a similar formulation.
Toxicity to aquatic plants	EC50 (Desmodesmus subspicatus (green algae)) 4,9 mg/l Exposure time: 72 h Test conducted with a similar formulation.

12.2 Persistence and degradability

Biodegradability	Fenoxaprop-P-ethyl: Not rapidly biodegradable Mefenpyr-diethyl: Not rapidly biodegradable reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): < 50 %, Exposure time: 10 d Not rapidly biodegradable
Koc	Fenoxaprop-P-ethyl: Koc: 11354 Mefenpyr-diethyl: Koc: 625

12.3 Bioaccumulative potential

Bioaccumulation	Fenoxaprop-P-ethyl: Bioconcentration factor (BCF) 338 Does not bioaccumulate. Mefenpyr-diethyl: Bioconcentration factor (BCF) 232 Does not bioaccumulate. reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): On the basis of the partition coefficient n-octanol/water (log pOW) no accumulation in organisms is expected.

12.4 Mobility in soil

Mobility in soil	Fenoxaprop-P-ethyl: Immobile in soil Mefenpyr-diethyl: Slightly mobile in soils reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): No data available

12.5 Results of PBT and vPvB assessment

PBT and vPvB assessment	Fenoxaprop-P-ethyl: This substance is not considered to be persistent, bioaccumulative and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulative (vPvB). Mefenpyr-diethyl: This substance is not considered to be persistent, bioaccumulative and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulative (vPvB). reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (3:1): No data available

12.6 Other adverse effects

Additional ecological information	No other effects to be mentioned.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product	Dispose of this product only by using according to the label, or at an approved landfill or other approved facility.
Contaminated packaging	Triple rinse containers. Recycle if possible. If allowed under local authority, burn if circumstances, especially wind direction permit, otherwise crush and bury in an approved local authority facility. Do not use container for any other purpose.

SECTION 14: TRANSPORT INFORMATION

This transportation information is not intended to convey all specific regulatory information relating to this product. It does not address regulatory variations due to package size or special transportation requirements.

ADR/RID/ADN

14.1 UN number	**3082**
14.2 Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (FENOXAPROP-P-ETHYL, SOLVENT NAPHTHA (PETROLEUM) HEAVY AROMATIC SOLUTION)
14.3 Transport hazard class(es)	9
14.4 Packing group	III
14.5 Environm. Hazardous Mark	YES
Hazchem Code	3Z

IMDG

14.1 UN number	**3082**
14.2 Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (FENOXAPROP-P-ETHYL, SOLVENT NAPHTHA (PETROLEUM) HEAVY AROMATIC SOLUTION)
14.3 Transport hazard class(es)	9
14.4 Packing group	III
14.5 Marine pollutant	YES

IATA

14.1 UN number	**3082**
14.2 Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (FENOXAPROP-P-ETHYL, SOLVENT NAPHTHA (PETROLEUM) HEAVY AROMATIC SOLUTION)
14.3 Transport hazard class(es)	9
14.4 Packing group	III
14.5 Environm. Hazardous Mark	YES

14.6 Special precautions for user
See sections 6 to 8 of this Safety Data Sheet.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code
No transport in bulk according to the IBC Code.

SECTION 15: REGULATORY INFORMATION

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

Further information

HSNO approval-Nr.	HSR000409
HSNO Controls	See www.epa.govt.nz
ACVM Reg.	P3945
ACVM Condition	See www.foodsafety.govt.nz

Other regulations

TRGS 510 Storage of hazardous substances in movable containers
BG Data Sheet M 017 "Solvents"
BG Data Sheet M 050 "Handling of Hazardous Substances"
BG Data Sheet M 053 "General Protective Measures for the handling of hazardous substances"

SECTION 16: OTHER INFORMATION

Abbreviations and acronyms

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute toxicity estimate
CAS-Nr.	Chemical Abstracts Service number
Conc.	Concentration
ECx	Effective concentration to x %
EINECS	European inventory of existing commercial substances
ELINCS	European list of notified chemical substances
EN	European Standard
EU	European Union
IATA	International Air Transport Association
IBC	International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)
ICx	Inhibition concentration to x %
IMDG	International Maritime Dangerous Goods
LCx	Lethal concentration to x %
LDx	Lethal dose to x %
LOEC/LOEL	Lowest observed effect concentration/level
MARPOL	MARPOL: International Convention for the prevention of marine pollution from ships
N.O.S.	Not otherwise specified
NOEC/NOEL	No observed effect concentration/level
OECD	Organization for Economic Co-operation and Development
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
TWA	Time weighted average
UN	United Nations
WHO	World health organisation

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe products in terms of their safety requirements. The above details do not imply any guarantee concerning composition, properties or performance of the product.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.