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

1.1 Product identifier

Trade name BETANAL QUATTRO

Product code (UVP) 06367933

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

Use Herbicide

EPA-Nr. HSR100882

1.3 Details of the supplier of the safety data sheet

Supplier
Bayer New Zealand Limited
CropScience Division
B:HIVE Building
74 Taharoto Rd
Smales Farm
Takapuna
Auckland, 0622
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) Notice 2020 as amended

Acute Tox. 4
H332 Harmful if inhaled.

STOT RE 2
H373 May cause damage to organs through prolonged or repeated exposure.

Aquatic Chronic 2
H411 Toxic to aquatic life with long lasting effects.

Hazardous to soil organisms
H421 Very toxic to the soil environment.
H433 Harmful to terrestrial vertebrates.

2.2 Label elements

Labelling in accordance with the Hazardous Substances (Safety Data Sheets) Notice 2020 as amended

Hazard label for supply/use required.

Signal word: Warning

Hazard statements

H332 Harmful if inhaled.
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.
H421 Very toxic to the soil environment.
H433 Harmful to terrestrial vertebrates.

Precautionary statements

P102 Keep out of reach of children.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P391 Collect spillage.
P314 Get medical advice/ attention if you feel unwell.
P501 Dispose of contents/container in accordance with local regulation.

2.3 Other hazards

No additional hazards known beside those mentioned.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Chemical nature

Suspo-emulsion (SE)
5.5% Phenmedipham (60 g/l), 5.5% Desmedipham (60 g/l), 5.5% Ethofumesate (60 g/l), 18.3% Metamitron (200 g/l)

Hazardous components

Chemical name	CAS-No.	Conc. [%]
Phenmedipham	13684-63-4	5.50
Desmedipham	13684-56-5	5.50
Ethofumesate	26225-79-6	5.50
Metamitron	41394-05-2	18.30
Ammonium distyrylphenyl ether sulphate	59891-11-1	>= 1.0 – < 3.0
Ethoxylated alcohols (C12-15)	68131-39-5	>= 0.1 – < 1
1,2-Benzisothiazol-3(2H)-one	2634-33-5	>= 0.005 – < 0.05

Further information

1,2-Benzisothiazol-3(2H)-one	2634-33-5	M-Factor: 10 (acute)

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. Call a physician or poison control center immediately.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician or poison control center immediately.

Ingestion Rinse mouth. Do NOT induce vomiting. Call a physician or poison control center immediately.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms Tiredness, Headache, Trembling, lethargy, Dyspnoea, ataxia

4.3 Indication of any immediate medical attention and special treatment needed

Risks This product, although being a carbamate, is NOT a cholinesterase inhibitor.

Treatment Treat symptomatically. In case of ingestion gastric lavage should be considered in cases of significant ingestions only within the first 2 hours. However, the application of activated charcoal and sodium sulphate is always advisable. There is no specific antidote. Forced alkaline diuresis and hemodialysis may be considered.

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 Water spray, Carbon dioxide (CO2), Foam, Sand

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 cyanide (hydrocyanic acid), Carbon monoxide (CO), Sulphur oxides, 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. Wear self-contained breathing apparatus and protective suit.
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. Collect and transfer the product into a properly labelled and tightly closed container.
Additional advice	Check also for any local site procedures.
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.
Advice on protection against fire and explosion	No special precautions required.
Hygiene measures	Avoid contact with skin, eyes and clothing. Keep working clothes separately. Wash hands before breaks and immediately after handling the product. Remove soiled clothing immediately and clean thoroughly before using again.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	Store in original container. Store in a place accessible by authorized persons only. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from frost. Keep away from direct sunlight.
Advice on common storage	Keep away from food, drink and animal feedingstuffs.

Suitable materials 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
Phenmedipham	13684-63-4	1.5 mg/m3 (TWA)		OES BCS*
Desmedipham	13684-56-5	1.2 mg/m3 (TWA)		OES BCS*
Ethofumesate	26225-79-6	10 mg/m3 (TWA)		OES BCS*
Soybean oil (Respirable dust.)	8001-22-7	3 mg/m3 (TWA)	11 2020	NZ OEL
Soybean oil (Inhalable dust.)	8001-22-7	10 mg/m3 (TWA)	11 2020	NZ OEL
Soybean oil (Mist.)	8001-22-7	10 mg/m3 (TWA)	06 2016	NZ OEL
1,2-Propanediol (Particulate.)	57-55-6	10 mg/m3 (TWA)	07 2011	NZ OEL
1,2-Propanediol (Vapor and particulates.)	57-55-6	474 mg/m3/150 ppm (TWA)	07 2011	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	suspension
Colour	white to light beige
Odour	aromatic
Odour Threshold	No data available
pH	4.0 - 7.0 (10 %) (23 °C) (deionized water)
Melting point/range	No data available
Boiling Point	No data available
Flash point	> 100 °C No flash point - Determination conducted up to the boiling point.
Flammability	No data available
Auto-ignition temperature	No data available
Ignition temperature	495 °C
Minimum ignition energy	No data available
Self-accelarating decomposition temperature (SADT)	No data available
Upper explosion limit	No data available
Lower explosion limit	No data available
Vapour pressure	No data available

Evaporation rate	No data available
Relative vapour density	No data available
Relative density	No data available
Density	ca. 1.09 g/cm³ (20 °C)
Water solubility	dispersible
Partition coefficient: n-octanol/water	Phenmedipham: log Pow: 3.59 Desmedipham: log Pow: 3.39 Ethofumesate: log Pow: 2.7 (25 °C) Metamitron: log Pow: 0.86
Viscosity, dynamic	150 - 350 mPa.s (20 °C) Velocity gradient 20 /s 50 - 160 mPa.s (20 °C) Velocity gradient 100 /s
Viscosity, kinematic	No data available
Surface tension	ca. 39 mN/m Determined as a 0,1% solution in distilled water (1 g/l).
Oxidizing properties	No oxidizing properties
Explosivity	No data available
9.2 Other information	Further safety related physical-chemical data are not known.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity	Stable under normal conditions.
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 hazard classes as defined in regulation (EC) No 1272/2008

Acute oral toxicity	LD50 (Rat) > 2,000 mg/kg

Acute inhalation toxicity	During intended and foreseen applications, no respirable aerosol is formed.
Acute dermal toxicity	LD50 (Rat) > 4,000 mg/kg
Skin corrosion/irritation	No skin irritation (Rabbit)
Serious eye damage/eye irritation	Slight irritant effect - does not require labelling. (Rabbit)
Respiratory or skin sensitisation	Skin: Non-sensitizing. (Guinea pig) OECD Test Guideline 406, Buehler test Skin: Sensitising (Mouse) OECD Test Guideline 429, local lymph node assay (LLNA)

Assessment STOT Specific target organ toxicity – single exposure

Phenmedipham: Based on available data, the classification criteria are not met.
Desmedipham: Based on available data, the classification criteria are not met.
Ethofumesate: Based on available data, the classification criteria are not met.
Metamitron: Based on available data, the classification criteria are not met.

Assessment STOT Specific target organ toxicity – repeated exposure

Phenmedipham caused haemolytic anaemia, methaemoglobinaemia in animal studies. The observed effects do not appear to be relevant for humans.
Desmedipham caused methaemoglobinaemia, haemolytic anaemia in animal studies. The observed effects do not appear to be relevant for humans.
Ethofumesate did not cause specific target organ toxicity in experimental animal studies.
Metamitron did not cause specific target organ toxicity in experimental animal studies.

Assessment mutagenicity

Phenmedipham was not mutagenic or genotoxic based on the overall weight of evidence in a battery of in vitro and in vivo tests.
Desmedipham was not mutagenic or genotoxic based on the overall weight of evidence in a battery of in vitro and in vivo tests.
Ethofumesate was not mutagenic or genotoxic in a battery of in vitro and in vivo tests.
Metamitron was not mutagenic or genotoxic in a battery of in vitro and in vivo tests.

Assessment carcinogenicity

Phenmedipham was not carcinogenic in lifetime feeding studies in rats and mice.
Desmedipham was not carcinogenic in lifetime feeding studies in rats and mice.
Ethofumesate was not carcinogenic in lifetime feeding studies in rats and mice.
Metamitron was not carcinogenic in lifetime feeding studies in rats and mice.

Assessment toxicity to reproduction

Phenmedipham caused reproduction toxicity in a two-generation study in rats only at dose levels also toxic to the parent animals. The reproduction toxicity seen with Phenmedipham is related to parental toxicity.
Desmedipham caused a reduced litter size and a reduced pup weight. The reproduction toxicity seen with Desmedipham is related to parental toxicity.
Ethofumesate did not cause reproductive toxicity in a two-generation study in rats.
Metamitron did not cause reproductive toxicity in a two-generation study in rats.

Assessment developmental toxicity

Phenmedipham caused developmental toxicity only at dose levels toxic to the dams. Phenmedipham caused a delayed ossification of foetuses. The developmental effects seen with Phenmedipham are

related to maternal toxicity.
Desmedipham caused developmental toxicity only at dose levels toxic to the dams. Desmedipham caused a delayed ossification of foetuses, an increased incidence of variations. The developmental effects seen with Desmedipham are related to maternal toxicity.
Ethofumesate did not cause developmental toxicity in rats and rabbits.
Metamitron did not cause developmental toxicity in rats and rabbits.

Aspiration hazard

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

11.2 Information on other hazards

Endocrine disrupting properties

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 (Oncorhynchus mykiss (rainbow trout)) 35 mg/l static test; Exposure time: 96 h
Toxicity to aquatic invertebrates	EC50 (Daphnia magna (Water flea)) 8.2 mg/l static test; Exposure time: 48 h
Chronic toxicity to aquatic invertebrates	NOEC (Daphnia (water flea)): 0.01 mg/l Exposure time: 21 d The value mentioned relates to the active ingredient desmedipham.
Toxicity to aquatic plants	IC50 (Desmodesmus subspicatus (green algae)) 8.6 mg/l static test; Exposure time: 72 h
	ErC50 (Myriophyllum spicatum (Eurasian watermilfoil)) = 0.479 mg/l static test; Exposure time: 14 d The value mentioned relates to the active ingredient ethofumesate.
	NOEC (Myriophyllum spicatum (Eurasian watermilfoil)) = 0.036 mg/l Growth rate; Exposure time: 14 d The value mentioned relates to the active ingredient ethofumesate.
	EC50 (Myriophyllum spicatum (Eurasian watermilfoil)) = 0.0519 mg/l Biomass; Exposure time: 7 d The value mentioned relates to the active ingredient phenmedipham.
	EC50 (Myriophyllum spicatum (Eurasian watermilfoil)) = 0.0705 mg/l Growth rate; Exposure time: 7 d The value mentioned relates to the active ingredient phenmedipham.
	EC10 (Myriophyllum spicatum (Eurasian watermilfoil)) = 0.028 mg/l Biomass; Exposure time: 14 d The value mentioned relates to the active ingredient phenmedipham.

EC10 (Myriophyllum spicatum (Eurasian watermilfoil)) = 0.0208 mg/l
Growth rate; Exposure time: 14 d
The value mentioned relates to the active ingredient phenmedipham.

12.2 Persistence and degradability

Biodegradability
Phenmedipham:
Not rapidly biodegradable
Desmedipham:
Not rapidly biodegradable
Ethofumesate:
Not rapidly biodegradable
Metamitron:
Not rapidly biodegradable

Koc
Phenmedipham: Koc: 888
Desmedipham: Koc: > 5000
Ethofumesate: Koc: 147
Metamitron: Koc: 86.4

12.3 Bioaccumulative potential

Bioaccumulation
Phenmedipham: Bioconcentration factor (BCF) 165
Does not bioaccumulate.
Desmedipham: Bioconcentration factor (BCF) 157
Does not bioaccumulate.
Ethofumesate: Bioconcentration factor (BCF) 144
Does not bioaccumulate.
Metamitron:
Does not bioaccumulate.

12.4 Mobility in soil

Mobility in soil
Phenmedipham: Slightly mobile in soils
Desmedipham: Immobile in soil
Ethofumesate: Moderately mobile in soils
Metamitron: Moderately mobile in soils

12.5 Results of PBT and vPvB assessment

PBT and vPvB assessment
Phenmedipham: 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).
Desmedipham: 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).
Ethofumesate: 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).
Metamitron: 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).

12.6 Endocrine disrupting properties

Assessment
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 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. (PHENMEDIPHAM, DESMEDIPHAM, ETHOFUMESATE, METAMITRON SOLUTION)
14.3 Transport hazard class(es)	9
14.4 Packaging 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. (PHENMEDIPHAM, DESMEDIPHAM, ETHOFUMESATE, METAMITRON SOLUTION)
14.3 Transport hazard class(es)	9
14.4 Packaging 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. (PHENMEDIPHAM, DESMEDIPHAM, ETHOFUMESATE, METAMITRON SOLUTION)
14.3 Transport hazard class(es)	9
14.4 Packaging 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.	HSR100882
HSNO Controls	See www.epa.govt.nz
ACVM Reg.	P8851
ACVM Condition	See www.foodsafety.govt.nz

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.

Reason for Revision: The following sections have been revised: Section 2: Hazards Identification. Section 3: Composition / Information on Ingredients. Section 4: First Aid Measures. Section 9: Physical and Chemical Properties.

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