1 IDENTIFICATION

Product Name:	Bushman Repellent Plus Personal Insect Repellent Pump Spray
Other Names:	Bushman 20% Pump Spray
Chemical Names:	Diethyltoluamide (DEET), Ethanol, N-octyl bicycloheptene dicarboximide
Uses:	Personal insect repellent
Supplier:	
Name:	Juno Ltd
Address:	68 Bond St West, Modialloc, Vic. 3195 Australia
Telephone:	+61 (0)3 9587 8514
Email:	info@junolabs.com.au
Emergency Telephone:	For ambulance, fire, police call: 000. For medical advice call: 13 11 26

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information

2 HAZARDS IDENTIFICATION

Users of the product should refer to the APVMA approved label on the container for advice in relation to use and handling of the product.

The hazard information contained in this SDS is for people handling the product and its ingredients in the manufacturing environment.

Classified as hazardous according to the criteria of the GHS as adopted in Australia.
Classified as a Dangerous Good according to ADG 7.9.

Poisons Schedule: Not Scheduled

Flammable Liquid	Category 2	H225	Highly flammable liquid and vapour
Acute toxicity (ingestion)	Category 4	H302	Harmful if swallowed
Eye irritation/corrosion	Category 2A	H319	Causes serious eye irritation
Skin Corrosion/irritation	Category 2	H315	Causes skin irritation
Skin Sensitision	Category 1B	H317	May cause an allergic skin reaction

Signal Word: Warning

Note: the following statements apply to non-consumers and manufacturing facilities. Consumers should follow the product label for safety advice.

Precautionary statements

Prevention:

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P242	Use non-sparking tools.
P243	Take action to prevent static discharges.
P261	Avoid breathing spray/mist
P264	Wash hands thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P272	Contaminated work clothing should not be allowed out of the workplace
P280	Wear protective gloves/protective clothing/eye protection

Response:

P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330	Rinse mouth
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with plenty water or shower.
P332 +P333 + P313	If skin irritation or rash occurs: Get medical advice/attention
P362 + P364	Take off contaminated clothing and wash it before reuse
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical attention**.**
P370 + P378	In case of fire: Use alcohol-resistant foam (preferred) or fine water spray to extinguish.

Storage:

P403 + P235	Store in a well-ventilated place. Keep cool.

Disposal:

P501	Dispose of contents and empty container in accordance with local/ regional/ national/ international Regulations.

3 COMPOSITION AND INFORMATION ON INGREDIENTS

Substance Name	CAS Number	Concentration
Ethanol	64-17-5	30 - 60%
Diethyltoluamide (DEET)	134-62-3	20%
N-octyl bicycloheptene dicarboximide (MGK-264)	113-48-4	12%
Other proprietary ingredients not individually contributing to the hazard classification		10 – 30%

4 FIRST-AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone 13 11 26.

First-Aid for handlers other than consumers. Consumers should follow label directions	
Inhalation	Specific treatment not normally required. If breathing difficult, move to fresh air and keep at rest in a position comfortable for breathing. Apply resuscitation if victim is not breathing.
Skin Contact	Intended for application to skin. If irritation occurs discontinue use. If irritation persists or skin sensitisation occurs seek medical advice.
Eye Contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists obtain medical advice.
Ingestion	Drink 1 or 2 glasses of water. Do not induce vomiting. Do not give anything by mouth to an unconscious person. Get medical attention. Contact a doctor or Poisons Information Centre. Phone 13 11 26.
Special Advice/Treatment:	No specific antidote. Treat symptomatically
Symptoms caused by exposure	Ethanol is severely irritating to the eyes. The vapour at high levels is irritating to the eyes and respiratory tract. The substance may cause effects on the central nervous system. Ethanol may cause dryness or cracking of skin. The substance may have effects on the upper respiratory tract and central nervous system. This may result in irritation, headache, fatigue and lack of concentration. The product is irritating to the skin, eyes and mucous membranes. It may cause skin sensitisation.

5 FIRE-FIGHTING MEASURES

Extinguishing Media:	Use alcohol-resistant foam (preferred) or fine water spray, water fog, dry chemical or carbon dioxide for extinction.
Specific hazards arising from the chemical:	May produce irritating and/or asphyxiating gases including carbon monoxide, carbon dioxide and oxides of nitrogen. **Flash Point:** 23.4°C (closed cup). **Explosion Limits: Lower:** 3.5% (ethanol); **Upper** 19% (ethanol)
Special protective equipment and precautions for firefighters:	Wear self-contained breathing apparatus and protective clothing if no risk of ignition. If potential for ignition keep containers cool by spraying water mist from a safe distance. Prevent run-off from entering drains, sewers and waterways.
Hazchem Code:	2YE

6 ACCIDENTAL RELEASE MEASURES

Emergency Procedures:

The consumer product is packaged in small containers. Large spills are unlikely. In case of **small spill**, Mop or wipe up and if necessary spread an absorbent material such as soil or sand over the spilled product. **For large spills:** Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Eliminate all sources of ignition and take measures to prevent static discharge. No smoking. Stop leak if safe to do so. Use water spray to disperse vapour.

Environmental Precautions:

Do not allow material to enter waterways or sewer. If large quantities of this material enter the waterways contact the Environmental Protection Authority, or your local Waste Management Authority.

Methods and materials for containment and cleaning up of spill:

In case of **small spill**, – sweep up absorbent material. Collect packaging and absorbent material, wrap in paper and dispose of in garbage. Wash area with water and detergent.

For large spills: Cover with non-combustible absorbent material (e.g. sand, soil, vermiculite). Shovel material into clean, dry, labelled containers and close lids. See Section 13 for disposal of the absorbent material at a landfill.

Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in air, soil or water; effects on animal, aquatic and plant life; and conformance with environmental and public health regulations.

7 HANDLING AND STORAGE

Precautions for Safe Handling:

The consumer product is designed for application to the skin. In the manufacturing environment avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge. Wash hands before breaks and at the end of workday.

Conditions for Safe Storage:

Store in dry, well-ventilated area out of reach of children and away from ignition sources, including flames and heat. Keep containers closed. Store away from oxidising materials.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure Limits: Exposure limits have been established by Safe Work Australia for some components of this product. This section is relevant to non-consumers. Consumers should follow the product label for personal protection advice.

Substance	TWA		STEL		Comments
	(ppm)	(mg/m^3)	(ppm)	(mg/m^3)	
Ethanol (WES)	1000	1880			Safe Work Australia requires the WES limits to be used until 30 November 2026. From 1 December 2026, the WEL must be used in workplaces.
Ethanol (WEL)	200	380	800	150	

Engineering Controls:

Local exhaust and/or mechanical exhaust, fitted with flame and explosion proof electrical fittings recommended

Personal Protective Equipment (Manufacturing environment):

Respiratory Protection:
Not normally required. Respiratory protection (organic vapour) should be used where vapours may accumulate. Air-purifying respirators should be used in oxygen deficient atmospheres.

Eye and Face Protection:
Eye protection (face shield or chemical resistant goggles) should be worn where there is potential for product to be splashed onto face or into eyes.
Note that DEET softens many plastics and face shields/goggles may be damaged if they come into contact with DEET.

Skin and Body Protection:
Chemical resistant gloves (butyl rubber) and footwear should be used when handling large quantities of the product.

9 PHYSICAL AND CHEMICAL PROPERTIES

physical state/colour	Clear viscous liquid	**pH**	5.5 – 6.5
odour	Scented	**kinematic viscosity**	1.074 mPa.s at 25 °C (ethanol)
melting point/freezing point	Not applicable	**solubility**	Not soluble or miscible in water
boiling point or initial boiling point and boiling range	78.2 °C (Ethanol) 290 °C (DEET)	**partition coefficient: n-octanol/water (log value)**	No data found
flammability	Highly flammable liquid	**vapour pressure**	10 kPa at 29.2 °C (ethanol); 0.002 mm Hg at 25 °C (DEET)
lower and upper explosion limit/flammability limit	Ethanol lower limit 3.8%. upper limit19%	**density and/or relative density**	0.854 – 0.874 @ 22°C
flash point	14°C (Closed cup – Ethanol)	**relative vapour density,**	No data found
Auto-ignition temperature	Ethanol - 287 °C	**particle characteristics**	Not applicable
decomposition temperature	No data found		

10 STABILITY AND REACTIVITY

Reactivity:
Highly flammable. ETHANOL reacts violently with acetyl chloride and acetyl bromide. Mixtures with concentrated sulfuric acid and strong hydrogen peroxide can cause explosions. Mixtures with concentrated hydrogen peroxide form powerful explosives. Reacts readily with hypochlorous acid and with chlorine.

Chemical Stability:
Stable under normal conditions.

Possibility of hazardous reactions:
Not known to polymerise.

Conditions to Avoid:
Excessive heat, sparks and flame

Incompatible materials:
Oxidizers, strong acids and alkalis, alkali metals, alcohols, peroxides and polyols.

Hazardous decomposition products:
When heated to decomposition will produce asphyxiating and irritating gases including carbon monoxide, carbon dioxide and oxides of nitrogen.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity:

Oral:

Low toxicity. Estimated LD_{50} > 5,000 mg/kg

Inhalation:

Not a likely route of exposure. Low toxicity expected. Could cause irritation

Dermal:

Low toxicity. Estimated LD_{50} >2000 mg/kg

Skin Corrosion/Irritation:

May cause irritation in some people.

Eye Damage/Irritation:

Can cause eye irritation. Liquid or mists sprayed into the eye may cause severe irritation or damage to the eyes.

Sensitisation:

May cause skin sensitivity in some people.

Germ cell mutagenicity:
No effects observed in laboratory animal studies.

Carcinogenicity:

IARC has classified ethanol as a carcinogen based on the effects caused by drinking alcoholic beverages.

Reproductive toxicity:
No evidence of reproduction and developmental toxicity in laboratory animals.

Specific Target Organ Toxicity:

No data are available for the product. Long term ingestion of ethanol may cause changes in liver, kidneys, gastrointestinal tract and heart muscle.

Aspiration Hazard:
No information found

Information on possible routes of exposure:
Inhalation and dermal.

Early onset symptoms related to exposure:
Ethanol: nausea, vomiting, CNS depression, acute respiratory failure.
DEET: eye and mucous membrane irritation.
MGK 264: central nervous excitation.

Delayed health effects from exposure:
Ethanol: Death and with chronic use, severe health problems, such as liver and brain damage.
MGK 264: depression

Exposure levels and health effects:
Ethanol: No relevant occupational information found.
DEET and MGK 264: No relevant occupational information found.

Interactive Effects:
No information found.

12 ECOLOGICAL INFORMATION

Ecotoxicity:

Based on information for the active constituent (DEET).
EC_{50} *Daphnia magna*: > 100 mg/L.
LC_{50} (96h) Rainbow trout: > 100 mg/L
LC_{50} (96h) Fathead minnow: >100 mg/L
N-Octyl bicycloheptene dicarboximide is highly toxic to aquatic organisms (LC50 *Daphnia magna* = 0.51 mg/L).

Persistence and Degradability:

The active constituent (DEET) modelling suggests rapid to moderate degradation. DEET: degraded in the atmosphere photochemically. Biodegradation in soil and water reached 0% in 28 days,

MGK 264: not expected to degrade in the atmosphere photochemically. Based on an aerobic biodegradation half-life of 341 days in soil, MGK 264 is not expected to biodegrade in water.

Contains materials of mineral origin that are likely to persist in the environment.

Ethanol: rapidly degraded in anaerobic microcosms. Mean half-life of 5.9 days for aerobic biodegradation.

Bioaccumulation Potential:

Ethanol: The estimated BCF of 3, from its log K_{ow} of -0.31(6) and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is low
Butane: The estimated BCF of 40, from its log K_{ow} and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is moderate.
DEET: BCFs of 0.8-2.4 measured in carp suggest bioconcentration in aquatic organisms is low.
MGK 264: The estimated BCF of 130, its log K_{ow} of 3.7 and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is high.
MGK 264 did not undergo hydrolysis after 30 days under environmental conditions (pH 5 to 9).

Mobility in soil:

Ethanol: The log K_{oc} value of 0.20, indicates that ethanol is expected to have very high mobility in soil.
Butane: The estimated K_{oc} value of 40 determined from a log K_{ow} of 2.89 and a regression-derived equation, indicates that n-butane is expected to have high mobility in so.
DEET: expected to have moderate mobility based upon an estimated K_{oc} of 115.
MGK 264: K_{oc} values of 636 and 310 indicate that MGK 264 is expected to have low to slight mobility in soil.

13 DISPOSAL CONSIDERATIONS

Disposal Methods:

Small quantities: small quantities may be disposed of in household garbage. Do not incinerate.

Large quantities: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with requirements of your local or area regulatory authorities. Do not incinerate. Containers may contain residual alcohol which could cause explosion if exposed to sources of ignition or heat. Note Section 8 when disposing of large quantities.

14 TRANSPORT INFORMATION

Classified as Dangerous Goods for Transport within Australia by Road and Rail according to the criteria of ADG 7.9.

UN Number:	1993
Proper Shipping Name:	FLAMMABLE LIQUID, N.O.S. (contains ethanol)
Class:	3
Packing Group:	III
Special Precautions:	Avoid spills contacting plastics.
HAZCHEM	•2YE

15 REGULATORY INFORMATION

Poison Scheduling:	Not Scheduled
APVMA Registration No:	69463

16 OTHER RELEVANT INFORMATION

Glossary:

ADG	Australian Code for the Transport of Dangerous Goods by Road & Rail
AS/NZS	Australian Standard/New Zealand Standard
BCF:	**Bioconcentration Factor -** a measure for the characterization of the accumulation of a chemical in an organism. It is defined as the concentration of a chemical in an organism (plants, microorganisms, animals) divided by the concentration in a reference compartment (e.g. food, surrounding water).
CAS Number:	Unique Chemical Abstracts Service Registry Number
EC_{50}:	Ecotoxic Concentration 50% – concentration in water which is fatal to 50% of a test population (e.g. daphnia, fish species).
ErC_{50}	The concentration of test substance which results in a 50 percent reduction in growth rate.

Explosive Limits:	The range of concentrations (% by volume in air) of a flammable gas or vapour that can result in an explosion for ignition in a confined space.
GHS:	Globally Harmonized System of classification and labelling of chemicals (GHS)
Hazchem Code:	Emergency action code of numbers and letters that provide information to emergency services, especially fire fighters
HCIS:	Hazardous Chemical Information System (http://hcis.safeworkaustralia.gov.au/HazardousChemical)
IARC:	International Agency for Research on Cancer
IDLH:	Immediately dangerous to life or health (**IDLH**) is **defined** by the US National Institute for Occupational Safety and Health (NIOSH)
K_{oc}	The organic carbon partition coefficient (mL soil water /g organic carbon)**.**
LC_{50}:	Lethal Concentration 50% – concentration in air which is fatal to 50% of a test population.
LC_{50}	The dose of a chemical that will kill 50% of the test animals receiving it.
NTP:	National Toxicology Program (USA)
pH:	Measure of how acidic or alkaline a material is using a 1 - 14 scale. pH 1 is strongly acidic and pH 14 strongly alkaline
P_{ow}:	The octanol-water partition coefficient. Commonly used to indicate potential the fate of chemicals in the environment
SDS:	Safety Data Sheet
STEL:	Short term exposure limit (STEL) means the time-weighted average maximum airborne concentration of a substance calculated over a 15 minute period.
SWA:	Safe Work Australia.
TWA:	8-hour Time-weighted average (TWA) means the maximum average airborne concentration of a substance when calculated over an eight-hour working day, for a five-day working week.
WEL:	Workplace exposure limit
WES:	Workplace exposure standard
UN Number:	United Nations Dangerous Goods Number

References:
Safe Work Australia Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice (2023). The exposure standards comply with the Australian Workplace Exposure Standards and Limits for Airborne Contaminants. The Dangerous Goods Classification complies with the Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.9, 2024. Other information from ChemIDPlus and linked databases and the European Chemicals Agency Classification and Labelling database. OECD SIDS.

Sections Revised: 2, 4, 8, 11, 16
Replaces revision: 28 September 2021

Disclaimer
This Safety Data Sheet (SDS) has been prepared in compliance with the Safe Work Australia Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice). The information in this SDS should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. The above information is believed to be correct but

does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Juno Limited shall not be held liable for any damage resulting from handling or from contact with the above product.

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