1 Identification

Product Name: Bushman Repellent Plus Personal Insect Repellent
Other Names: Bushman Plus Aerosol (BP50, BP150, BP350)
Chemical Name(s): N-octyl bicycloheptene dicarboximide, Diethyltoluamide (DEET), butanol and ethanol-
Recommended Uses: Personal Insect Repellent
Supplier
Name: Juno Ltd.
Address: 68 Bond St West, Modialloc, Vic. 3195, Australia
Phone Number: +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

The hazard information contained in this SDS is for non-consumers handling the product and its ingredients. Consumers should refer to the APVMA approved label on the container for advice in relation to use and handling of the product.

Aerosol (liquid under pressure): Classified as hazardous according to the criteria of the GHS as adopted in Australia. A Dangerous Good according to ADG 7.7

Poisons Schedule: Not Scheduled
GHS Hazard Statement(s)

Aerosol	Category 1	H222 H229	Extremely flammable aerosol Pressurised container: May burst if heated
Eye irritation/corrosion	Category 2A	H319	Causes serious eye damage
Skin Corrosion irritation	Category 2	H315	Causes skin irritation

Signal Word: Danger

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

	Prevention:	
Precautionary	P210	Keep away from, heat, hot surfaces, sparks, open flames and

statements

	other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use
P264	Wash hands and face thoroughly after handling.
P280	Wear eye protection/face protection.

Response:

P321	Specific treatment: If poisoning occurs, contact a Doctor or Poisons Information Centre – Phone Australia 13 11 26.
P302 + P352	IF ON SKIN: Wash with plenty water
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333 +337+ P313	If skin or eye irritation or rash occurs: Get medical advice/ attention
P362 + P364	Take off contaminated clothing and wash it before reuse.

Storage:

P410 + P412	Protect from sunlight. Do not expose to temperatures exceeding 50°C

Disposal:

P501	Dispose of contents/ container in accordance with local/ regional/ national Regulations

Identity (Other Names)	**CAS Number**	**Proportion (w/w)**
Ethanol	64-17-5	30 - 60%
Unodourised LPG (ELGAS)	68476-85-7	10 – 30%
DEET (Diethyltoluamide)	134-62-3	20%
N-octyl bicycloheptene dicarboximide (MGK 264)	113-48-4	1.1%
Other proprietary ingredients not individually contributing to hazard		<10%

3 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.	
Swallowed:	Give water to drink. Contact a doctor or Poisons Information Centre (Phone 13 11 26)
In Eye:	Wash continuously with water for 15 minutes. Seek prompt medical attention.
On Skin:	Intended for application to skin. Remove with soap and water if irritation occurs. Seek Medical advice if irritation persists.
Inhaled:	Remove to fresh air. If breathing difficulties are experienced, seek

	medical attention.
Advice to Doctor	Treat symptomatically
Symptoms caused by exposure	Irritating to the skin, eyes and mucous membranes. Severe inhalation over exposure may sensitise the heart to catecholamine induced arrhythmias.

5 Fire Fighting Measures

Based on ethanol and butane

Extinguishing Media:	Foam, dry chemical, CO_2 or water fog
Specific hazards arising from the chemical	Aerosol containers. HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames. Vapours may form explosive mixtures with air. Vapours may travel to source of ignition and flash back. Most vapours are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Hazardous carbon and nitrogen oxides formed under fire conditions
Special protective equipment and precautions for firefighters:	Fight fire from maximum distance possible or from protected area. Wear self-contained breathing apparatus and protective clothing.
Hazchem Code:	●2YE assigned according to the rules and LPG content. ADG 7.7 has not issued a code

6 Accidental Release Measures

Based on LPG content

Emergency Procedures: Avoid inhalation of vapour. Extinguish any sources of ignition. As an immediate precautionary measure, isolate spill or leak area for at least 50 meters in all directions. Do not puncture cans – move leaking cans to an open area and spray with water to dissipate the LPG vapour. Never leave or move a leaking cylinder into a confined space (building, shed or vehicle) as vapour will collect in the confined space, creating several hazards. See Section 7 for more detail. FIRE: If truck load is involved in a fire, ISOLATE for 800 meters in all directions; also, consider initial evacuation for 800 meters in all directions. (ERG, 2016). Sec section 8 for suitable protective equipment.
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:
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, sand over the spilled product. **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:

Product is designed for application to the skin. Avoid contact with eyes and plastics. Do not intentionally concentrate or inhale. Keep away from sources of ignition - No smoking.

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. Use appropriate engineering controls: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk-through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements, or confined areas. A vapor-suppressing foam may be used to reduce vapours. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean, non-sparking tools to collect absorbed material. LARGE SPILL: Dike far ahead of liquid spill for later disposal. Water spray may reduce vapor but may not prevent ignition in closed spaces. (ERG, 2016)

Conditions for Safe Storage:

Store out of reach of children. Keep cool and away from flame.

8 Exposure Controls / 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.

Product Component Exposure Standards:

Substance	SWA (ppm)	TWA (mg/m^3)	STEL (ppm)	STEL mg/m^3)	Comments
LPG	800	1900			
Ethanol	1000	1880			

Based on ethanol and butane components

Engineering Controls:

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

Personal Protective Equipment - for manufacturing and bulk handling situation:

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:

Consumer Product is intended for application to skin, hence, protection not required. **In the manufacturing environment** wear appropriate long-sleeved personal protective clothing to prevent skin contact. Chemical resistant gloves (butyl rubber) and footwear should be used when handling large quantities of the product.

Respiratory Protection:

Local exhaust and/or mechanical exhaust, fitted with flame and explosion proof electrical fittings recommended. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

9 Physical and Chemical Properties

Mainly based on LPG content (20% butane/80% propane)

Product physical state/colour	Clear liquid	**Product pH**	7.5 - 8
Product odour	No distinctive odour	**kinematic viscosity**	Ethanol - 1.074 mPa.s at 25 °C
melting point/freezing point	Not applicable	**Water solubility**	Ethanol - Miscible LPG - 0.07cm3 / cm3
boiling point or initial boiling point and boiling range	Ethanol 78.2 °C Butane -0.5°C	**partition coefficient: n-octanol/water (log value)**	Not applicable
flammability	Highly flammable	**vapour pressure**	Ethanol -10 kPa at 29.2 °C; Propane 1530 kPa (max) Butane 520 kPa (max)
lower and upper explosion limit/flammability limit	Butane gas– lower flammable limit 1.9 %. Upper limit 8.6 % Propane gas - lower flammable limit 2.4 %. Upper limit 9.6 % Ethanol lower limit 3.8%. upper limit 19%	**density and/or relative density (Water = 1):**	Density (kg/m^3) Butane liquid 568 Butane gas 2.47 Propane liquid 510 Propane gas 1.86
flash point	Not applicable to Aerosols	**relative vapour density (Air = 1):**	No product data found
Auto-ignition temperature	Butane gas– 372 °C Propane gas – 450 °C Ethanol - 287 °C	**particle characteristics**	Not applicable
decomposition temperature	No data found		

10 Stability and Reactivity

Reactivity:

Highly flammable.
LPG reacts violently with oxidising agents. Incompatible with oxidising agents, acids, heat and ignition sources. 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:

DEET: no hazardous reactions known.
LPG: Reacts violently with oxidising agents.
Ethanol: Explodes on contact with calcium hypochlorite Vapor may explode if ignited in an enclosed area. Containers may explode when heated or involved in a fire. Also explodes in contact with many other chemicals.

Conditions to Avoid:

Excessive heat, sparks and flame

Incompatible materials:

Oxidizers, strong acids and alkalis, alkali metals, alcohols, peroxides and polyols. Do not use natural rubber flexible hoses. Incompatible (potentially violently) with oxygen, halogens and metal halides.

Hazardous decomposition products:

Carbon and nitrogen oxides. Heating to decomposition produces acrid smoke and irritating fumes.

11 Toxicological Information

Acute Toxicity:

Oral:

Low toxicity. Product estimated LD_{50} > 2,000 mg/kg

Inhalation:

Not a likely route of exposure of exposure from use according to label directions. Low toxicity expected. Could cause irritation.
DEET: Rat 4-hour LC_{50} > 2.02 mg/L.
LPG: Not classified as toxic by inhalation.
Ethanol: Under normal conditions of use and handling, no inhalation hazard is present (rat 10-hour LC_{50} 20g/L). It may cause irritation to respiratory system if inhaling concentrated vapor of this liquid. Symptoms may include coughing, drowsiness, dizziness and tightness in chest.
MK264: No data found,

Dermal:

Low toxicity. Product 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:

Based on available data not classified as causing skin or respiratory sensitisation.

Germ cell mutagenicity:

No effects observed in laboratory animal studies.

Carcinogenicity:

Not classified as a carcinogen although IARC has classified ethanol as a carcinogen based on the effects caused by drinking alcoholic beverages. Occupational exposure is not known to result in carcinogenic effects**.**

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. LPG is an asphyxiant gas.

Aspiration Hazard:

Based on available not classified as an aspiration hazard.

Information on possible routes of exposure:

Inhalation and dermal.

Early onset symptoms related to exposure:

Ethanol: nausea, vomiting, CNS depression, acute respiratory failure.
LPG: drowsiness, narcosis, asphyxia; liquid: frostbite.
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

Interactive Effects:

No information found.

12 Ecological Information

Ecotoxicity:

Ethanol: Lowest acute aquatic LC_{50} 34.9 g/L. No chronic data found.
LPG: Not toxic to flora, fauna or soil organisms. Will not cause long term adverse effects in the environment and is not dangerous to the ozone layer.
MGK 264: daphnia EC_{50} 2.3 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,

Ethanol: rapidly degraded in anaerobic microcosms. Mean half-life of 5.9 days for aerobic biodegradation.
LPG: Unlikely to cause long term adverse effects in the environment.
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.

Bioaccumulative potential:
Ethanol: The estimated BCF of 3, from its log K_{ow} of -0.31 and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is low
LPG: Not expected to bioaccumlate.
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.
LPG: Spillages are unlikely to penetrate the soil. The product is likely to vaporise rapidly into the air.
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 puncture cans. 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 your local or area regulatory authorities. Do not incinerate. Containers may contain residual alcohol which could cause explosion if exposed to sources of ignition. Note Section 8 when disposing of large quantities.

14 Transport Information

Consult the ADG 7.7, IMDG and ICAO/IATA Codes for all the transport requirements for the specified UN Number.

	Land Transport (ADG 7.7)	Sea Transport (IMDG)*	Air Transport (ICAO/IATA)*
UN Number	1950	1950	1950
UN proper shipping name	AEROSOL	AEROSOL	AEROSOL
Transport Hazard Class	2	2	2
Packaging Group	None assigned - see packaging instructions		
Marine Pollutant		No	
Limited Quantities*	See SP 277		

'* Consult IMDG Code for sea transport and ICAO/IATA Code for air transport provisions and instructions.

Packaging Instructions
P207: Authorised packaging for UN 1950 – see page 774 of ADG 7.7.

Environmental hazards for transport purposes	Classified as Aquatic chronic hazard category 2 – toxic to aquatic life with long lasting effects. Not a marine pollutant.
Special Precautions for User:	Do not puncture cans. Keep away from sources of heat.
Hazchem Code:	•2YE assigned according to the rules and LPG content. ADG 7.7 has not issued a code.

15 Regulatory Information

Poison Scheduling:	Not Scheduled
Registration/Notification:	APVMA Number 47106
Montreal Protocol (Ozone depleting substances) https://www.environment.gov.au/protection/ozone/montreal-protocol	Does not contain an ozone depleting substance
The Stockholm Convention (Persistent Organic Pollutants) http://chm.pops.int/Home/tabid/2121/Default.aspx	Does not contain a POP
The Rotterdam Convention (Prior Informed Consent) http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals	Not a chemical included in Annex III
Basel Convention (Hazardous Waste)	The Basel Convention may be triggered when disposing of this product as a waste. See Annex 1 Categories of Wastes to be Controlled.

International Convention for the Prevention of Pollution from Ships (MARPOL)	Human health: See section 11. Bioaccumulation & Biodegradation: see section 12. Aquatic toxicity: See section 12. Interference with other uses of the sea: none known

16 Other Information

Glossary

ADG	Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.5, 2017
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.
WES:	Workplace exposure standard
UN Number:	United Nations Dangerous Goods Number

References:
Work Safe Australia Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice (2020). The exposure standards comply with the Australian Workplace Exposure Standards for Airborne Contaminants. The Dangerous Goods Classification complies with the Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.7, 2020. Other information from ChemIDPlus and linked databases and the European Chemicals Agency Classification and Labelling database. Component SDSs.

Date Prepared:	9 September 2021
Replaces:	15 December 2016
Sections Revised:	All

Disclaimer
This Safety Data Sheet (SDS) has been prepared in compliance with the Work Safe 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.