Safety Data Sheet 2,2,4-TRIMETHYLPENTANE

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SECTION 1: Identification

GHS Product identifier

Product name	2,2,4-TRIMETHYLPENTANE

Recommended use of the chemical and restrictions on use

Solvent, thinner, for determining octane numbers of fuels, organic synthesis intermediate, azeotropic distillation entrainer, spectrophotometric analysis and laboratory reagent.

Supplier's details

Name	ChemSupply Australia Pty Ltd
Address	38-50 Bedford Street 5013 Gillman South Australia Australia
Telephone	08 8440 2000
email	www.chemsupply.com

Emergency phone number

CHEMCALL 1800 127 406 (Australia) / +64-4-917-9888 (International)

SECTION 2: Hazard identification

General hazard statement

Classified as dangerous goods according to the Australian Dangerous Goods Code (ADG).

Classified as Hazardous according to the Globally Harmonised System of classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Classification of the substance or mixture

GHS classification in accordance with: UN GHS revision 7

- Hazardous to the aquatic environment, short-term (acute), Cat. 1
- Hazardous to the aquatic environment, long-term (chronic), Cat. 1
- Aspiration hazard, Cat. 1
- Flammable liquids, Cat. 2
- Skin corrosion/irritation, Cat. 2
- Specific target organ toxicity following single exposure, Cat. 3

GHS label elements, including precautionary statements

Pictograms

Signal word	**Danger**

Hazard statement(s)

H225	Highly flammable liquid and vapor
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H336	May cause drowsiness or dizziness
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

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.
P241	Use explosion-proof [electrical/ventilating/lighting/...] equipment.
P242	Use non-sparking tools.
P243	Take action to prevent static discharges.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physcian
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312	Call a POISON CENTER/doctor/physcian if you feel unwell.
P331	Do NOT induce vomiting.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
P370+P378	In case of fire: Use agents recommended in Section 5 of SDS for extinction
P391	Collect spillage.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container to an approved waste disposal facility

SECTION 3: Composition/information on ingredients

Mixtures

Molecular weight: 114.23

Components

Component	Concentration
2,2,4-Trimethylpentane (CAS no.: 540-84-1; EC no.: 208-759-1; Index no.: 601-009-00-8)	99.5 - <= 100 % (weight)

CLASSIFICATIONS: Flammable liquids, Cat. 2; Aspiration hazard, Cat. 1; Skin corrosion/irritation, Cat. 2; Specific target organ toxicity following single exposure, Cat. 3; Hazardous to the aquatic environment, short-term (acute), Cat. 1; Hazardous to the aquatic environment, long-term (chronic), Cat. 1. HAZARDS: H225 - Highly flammable liquid and vapor; H304 - May be fatal if swallowed and enters airways; H315 - Causes skin irritation; H336 - May cause drowsiness or dizziness; H400 - Very toxic to aquatic life; H410 - Very toxic to aquatic life with long lasting effects.

SECTION 4: First-aid measures

Description of necessary first-aid measures

General advice	First Aid Facilities: Maintain eyewash fountain and drench facilities in work area.
If inhaled	If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
In case of skin contact	Wash off with soap and plenty of water. Get medical attention if symptoms occur.
In case of eye contact	If contact with the eye(s) occurs, wash with copious amounts of water for approximately 15 minutes holding eyelid(s) open. Take care not to rinse contaminated water into the non-affected eye. Seek medical attention if irritation, pain, swelling, lacrimation, or photophobia persists.
If swallowed	Rinse mouth thoroughly with water immediately, repeat until all traces of product have been removed. DO NOT INDUCE VOMITING. Seek immediate medical advice.

Most important symptoms/effects, acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

Indication of immediate medical attention and special treatment needed, if necessary
Treat symptomatically based on judgement of doctor and individual reactions of the patient.

For advice in an emergency, contact a Poisons Information Centre (Phone Australia 131 126) or a doctor at once.

SECTION 5: Fire-fighting measures

Suitable extinguishing media
Caution: Use of water spray when fighting fire may be inefficient.
Small fire: Use foam, dry chemical, CO2 or water spray.
Large fire: Use foam, fog or water spray - Do not use water jets.
If safe to do so, move undamaged containers from fire area. Cool containers with flooding quantities of water until well after fire is out.
Avoid getting water inside containers.

Specific hazards arising from the chemical
Toxic and/or irritating fumes, including carbon monoxide and carbon dioxide.

HIGHLY FLAMMABLE: These products have a low flash point - Will be easily ignited by heat, sparks or flames at ambient temperatures. Vapours will form explosive mixtures with air. Vapours will travel to source of ignition and flash back. Fire may produce irritating, poisonous and/or corrosive gases. Containers may explode when heated. Many liquids are lighter than water. Many vapours are heavier than air and will collect in low or confined areas (drains, basements, tanks). Vapours from run-off may create an explosion hazard.

Special protective actions for fire-fighters
Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA) operated in positive pressure mode. Fight fire from safe location.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures
ELIMINATE all ignition sources (no smoking, flares, sparks or flame) within at least 50m -

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

Methods and materials for containment and cleaning up
ELIMINATE all ignition sources (no smoking, flares, sparks or flame) within at least 50m - All equipment used in handling the product must be earthed. Do not touch or walk through spilled material.
Stop leak if safe to do so - Prevent entry into waterways, drains or confined areas. Vapour-suppressing foam may be used to control vapours. Absorb spill with earth, sand or other non-combustible material - Use clean, non-sparking tools to collect material and place it in loosely-covered metal or plastic containers for later disposal. Water spray may be used to knock down or divert vapour clouds.
SEEK EXPERT ADVICE ON HANDLING AND DISPOSAL.

SECTION 7: Handling and storage

Precautions for safe handling
Avoid ingestion and inhalation of gas/fumes/vapour/spray mists. Avoid contact with eyes, skin, and clothing. Avoid generation or build up of mists/vapours/aerosols in the atmosphere. Keep container tightly closed. Open containers cautiously as contents may be under pressure. Use only in a well-ventilated area. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Wear suitable protective clothing. It is essential that all who cone into contact with this material maintain high standards of personal hygiene ie. Washing hands prior to eating, drinking, smoking or using toilet facilities. Fumes can combine with air to form an explosive mixture. Take precautionary measures against static discharges. Ground all equipment containing material. Keep away from heat and sources of ignition - No smoking. Do not use near welding. Use spark-proof tools and explosion proof equipment and lighting. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis. Do not empty into drains. Do NOT use compressed air for filling, discharging, or handling. Do NOT pressurise, cut, heat or weld containers as they may contain hazardous residues.

Conditions for safe storage, including any incompatibilities
Store in a segregated and approved Flammables-area. Store in tightly closed containers, in a cool, dry, well-ventilated area away from incompatible substances. Protect against physical damage, direct sunlight and moisture. Store away from oxidising agents, reducing agents, foodstuffs, and clothing. Have appropriate fire extinguishers available in and near the storage area. Containers of this material may be hazardous when empty since they retain product residues (vapours, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove.

SECTION 8: Exposure controls/personal protection

Appropriate engineering controls
Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, gas, etc.) below recommended exposure limits.f the engineering controls are not sufficient to maintain concentrations of vapours/mists below the exposure standards, suitable respiratory protection must be worn.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection
The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336.

Skin protection

Clean impervious clothing should be worn. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.

Hand Protection: Normally not required but if in doubt ensure hand protection should complies with AS 2161, Occupational protective gloves - Selection, use and maintenance.

Body protection
Suitable protective workwear, e.g. cotton overalls buttoned at neck and wrist is recommended. Chemical resistant apron is recommended where large quantities are handled.

Respiratory protection
If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable vapor/ mist filter should be used. Refer to relevant regulations for further information concerning respiratory protective requirements. Reference should be made to Australian Standards AS/ NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

SECTION 9: Physical and chemical properties

Basic physical and chemical properties

Physical state	Liquid
Appearance	Clear, colourless, mobile liquid.
Color	No data available.
Odor	Nearly odourless, benzene-like, or gasoline-like odour.
Odor threshold	No data available.
Melting point/freezing point	-107 °C
Boiling point or initial boiling point and boiling range	98 - 102 °C.
Flammability	No data available.
Lower and upper explosion limit/flammability limit	Flammable Limits - Lower: 0.7 vol%. Flammable Limits - Upper: 6 vol%.
Flash point	-12 °C (CC); 4.5 °C (OC).
Explosive properties	Product is not explosive. However, above flash point, vapour-air mixtures are explosive within flammable limits noted above. Extremely explosive in presence of open flames, sparks and static discharge. Containers may explode in the heat of a fire.
Auto-ignition temperature	410 °C at 1013 hPa; 420 °C.
Decomposition temperature	No data available.
Oxidizing properties	No oxidizing properties.
pH	~ 7.
Kinematic viscosity	Viscosity: 0.51 mPas (22 °C).
Solubility	Solubility in Water: Partially insoluble in water (0.56 mg/l (25 °C)). Solubility in Organic Solvents: Miscible with acetone, heptane; soluble in benzene, toluene, xylene, chloroform, diethyl ether, carbon disulfide, carbon tetrachloride, DMF and oils, except castor oil; sparingly soluble in absolute alcohol.
Partition coefficient n-octanol/water (log value)	log Pow: 4.5 (calculated).
Vapor pressure	55 hPa (41 mmHg) at 21 °C; 117 hPa (88 mmHg) at 37.80 °C.
Evaporation rate	3.63 compared to (n-Butyl Acetate=1); < 1 (Ether = 1).
Density and/or relative density	Specific Gravity: 0.69.
Relative vapor density	3.93

Particle characteristics
No data available.

Supplemental information regarding physical hazard classes
No data available.

Further safety characteristics (supplemental)
Other Information: Refractive Index: 1.39157 @ 20 °C/D.
Antiknock Octane Number:100.
Dipole Moment: 0.

SECTION 10: Stability and reactivity

Reactivity
Stable under normal conditions of storage and handling.

Chemical stability
Stable under normal conditions of use and storage.

Possibility of hazardous reactions
Highly reactive with oxidizing agents. Reactive with reducing agents. May react with strong acids and strong bases.

Conditions to avoid
Heat, ignition sources (flames, sparks, static) and incompatible materials.

Incompatible materials
Strong oxidizing agents, reducing agents, strong acids, strong bases, oxygen and various plastics.

Hazardous decomposition products
Toxic and/or irritating fumes, including carbon monoxide and carbon dioxide.

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity
Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation with nausea, vomiting, and diarrhoea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, agitation and nausea. Advanced stages and ingestion of large doses may cause narcosis, shallow respiration, collapse, convulsions, unconsciousness, coma and possible death due to respiratory failure. May cause ventricular fibrillation, cardiovascular failure, kidney, liver and bone marrow damage. Aspiration hazard if swallowed - may cause nausea, vomiting, pulmonary irritation, oedema, bloody sputum, bronchial pneumonia with fever and coughing and can enter lungs and cause chemical pneumonitis, which may be fatal.

Inhalation: May be harmful if inhaled. May cause irritation of the respiratory tract (nose, throat and lungs), especially where vapours or mists are generated, with burning pain in the nose and throat, coughing, wheezing, sneezing, shortness of breath, pulmonary oedema and possible behaviour/central nervous system effects. High concentrations of vapours may cause narcotic effects (CNS depression - dizziness, drowsiness, lightheadedness, poor coordination, reduced alertness, headache, confusion, unconsciousness, coma) and cause nausea and vomiting. Higher levels could cause <qt>chemical pneumonia<qt> and may cause you to pass out and even cause respiratory arrest (approx. 16,000 ppm). May cause symptoms similar to those of ingestion. Inhalation of aliphatic hydrocarbons (6-18 C) in general may lead to the formation of oedemas in the respiratory tract.

Skin corrosion/irritation

Causes skin irritation, resulting in redness and itching. Has a degreasing effect on the skin, possibly followed by secondary inflammation. May cause an allergic dermatitis.

Serious eye damage/irritation
May cause eye irritation, with redness, tearing, blurred vision, stinging, itching, and pain.

Respiratory or skin sensitization
No data available.

Germ cell mutagenicity
Mutagenicity: Unscheduled DNA synthesis, oral, rat, 500 mg/kg.
Unscheduled DNA synthesis, oral, mouse, 500 mg/kg.

Carcinogenicity
Not listed in the IARC Monographs.

Reproductive toxicity
No data

Specific target organ toxicity (STOT) - single exposure
The substance may cause effects on the kidneys, liver and nervous system.

Specific target organ toxicity (STOT) - repeated exposure
No Data

Aspiration hazard
Has to be regarded as if it causes a human aspiration toxicity hazard.

Additional information
Chronic Effects: Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. Prolonged or repeated exposure may affect the eyes, kidneys, lungs and liver and may cause central nervous system (CNS) disorders and paralysis symptoms.

SECTION 12: Ecological information

Toxicity
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and degradability
Biological degradability: moderate. Insoluble in water Persistence is unlikely based on information available. Immiscible with water

Bioaccumulative potential
High (Log Pow >4).

Mobility in soil
Will likely be mobile in the environment due to its volatility. Is not likely mobile in the environment due its low water solubility.

Results of PBT and vPvB assessment
No data available.

Endocrine disrupting properties
No data available.

Other adverse effects
No data available.

SECTION 13: Disposal considerations

Disposal methods

Product disposal
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers.

Sewage disposal
High (Log Pow >4).

Other disposal recommendations
Do not discharge this material into waterways, drains and sewers.

SECTION 14: Transport information

ADG (Road and Rail)
UN Number: 1262
Class: 3
Packing Group: II
Proper Shipping Name: OCTANES

[3l] Environmental Hazards: Risk of formation of explosive vapours above water surface. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. High bioaccumulation potential.

Hazchem emergency action code (EAC)
3YE

IMDG
UN Number: 1262
Class: 3
Packing Group: II
EMS Number:
Proper Shipping Name: OCTANES

IATA
UN Number: 1262
Class: 3
Packing Group: II
Proper Shipping Name: OCTANES

SECTION 15: Regulatory information

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

Australia SUSMP
Poison Schedule: S5

SECTION 16: Other information

Further information/disclaimer

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Preparation information

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Standard for the Uniform Scheduling of Medicines and Poisons, Commonwealth of Australia
National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.'
Safe Work Australia, 'National Code of Practice fot the Preparation of Safety Data Sheets for Hazardous Chemicals', July 2020.
Safe Work Australia, 'National Guide for Classifying Hazardous Chemicals', July 2020.
Safe Work Australia, Workplace Exposure Standards for Airbourne Contaminants, December 2019
Safe Work Australia, Hazardous Chemical Information System (HCIS), hcis.safeworkaustralia.gov.au
IATA, Dangerous Goods Regulations (DGR)
IMO, International Maritime Dangerous Goods Code (IMDG)