

MATERIAL SAFETY DATA SHEET

Cyclohexane



SECTION 1: IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name:	Cyclohexane
Other Names:	Hexahydrobenzene, Hexamethylene
Product Codes/Trade Names:	Cyclohexane
Recommended Use:	As an organic solvent
Applicable In:	Australia
Supplier:	Sucrogen BioEthanol Pty Ltd (ABN 85 009 660 191)
Address:	664 Lorimer St, Port Melbourne, Victoria, 3207, Australia
Telephone:	+61 3 9676 7200 or 1800 819 618 (applicable in Australia only)
Email Address:	bioethanol@sucrogen.com
Web Site:	www.sucrogen.com
Facsimile:	+61 3 9676 7220 or 1800 647 260 (applicable in Australia only)
Emergency Phone Number:	000 Fire Brigade and Police (available in Australia only)
Poisons Information Centre:	13 11 26 (available in Australia only)

This Material Safety Data Sheet (MSDS) is issued by the Supplier in accordance with National Standards and Guidelines from Safe Work Australia (SWA – formerly ASCC/NOHSC). The information in it must not be altered, deleted or added to. The Supplier will not accept any responsibility for any changes made to its MSDS by any other person or organization. The Supplier will issue a new MSDS when there is a change in product specifications and/or Standards, Codes, Guidelines, or Regulations.

SECTION 2: HAZARD IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE: Classified as **Hazardous** according to the Approved Criteria For Classifying Hazardous Substances [NOHSC:1008] 3rd Edition.

Cyclohexane is classified as **Dangerous Goods** according to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

Risk Phrases	Safety Phrases
R11 - Highly flammable. R20/22 - Harmful by inhalation and if swallowed. R36/38 - Irritating to eyes and skin. R66 - Repeated exposure may cause skin dryness and cracking.	S7/9 - Keep container tightly closed and in a well ventilated place. S16 - Keep away from sources of ignition - No smoking. S23 - Do not breathe vapour. S24/25 - Avoid contact with skin and eyes. S29 - Do not empty into drains. S33 - Take precautionary measures against static discharges. S36/37/39 - Wear suitable protective clothing/gloves and eye/face protection.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name:	Synonyms	Proportion:	CAS Number:
Cyclohexane	–	100% v/v	110-82-7

SECTION 4: FIRST AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre.

Swallowed:	<p>If a minor amount has been accidentally swallowed, then, if conscious, rinse mouth with water and then dilute stomach contents by giving large amounts of water. Seek medical attention.</p> <p>Do not attempt to induce vomiting or give anything by mouth to an unconscious person. If person vomits, place person on their side in recovery position.</p>
Eyes:	Flush eye with flowing water for a minimum of 15 minutes. Seek medical attention promptly if irritation persists or any loss of vision occurs
Skin:	<p>Remove contaminated clothing. Wash contaminated skin with soap and water. Seek medical attention if swelling, redness, blistering or irritation persists.</p> <p>Launder contaminated clothing before re-use.</p>
Inhaled:	<p>Remove promptly to fresh air. If there are signs of drunkenness (intoxication or inebriation) or respiratory irritation, dizziness, nausea or headache occurs, seek immediate medical attention.</p> <p>Treat unconsciousness by placing the person in the coma position. Apply artificial respiration if breathing stops.</p>
First Aid Facilities:	Safety showers, eye wash stations and First Aid kits.
Advice to Doctor:	Treat symptomatically and as for a narcotic substance.

SECTION 5: FIRE FIGHTING MEASURES

Flammability:	<p>Highly flammable liquid. May form flammable mixtures with air. Burns with a colourless flame. The vapour is heavier than air and may travel along the ground; instant ignition and flash back are possible.</p> <p>Run off to sewers and drains may cause explosions. Isolate for at least 800 metres in all directions if tanks or tankers are involved. The use of compressed air for filling, discharging, mixing or handling is prohibited due to the vapour hazard.</p> <p>All vessels must be earthed to avoid generation of static charges when agitating or transferring solvents. Avoid all ignition sources. Intrinsically safe equipment is necessary in areas where this chemical is being used.</p>
Suitable extinguishing media:	Normal foam should be used. Water fog, fine water spray, dry chemical or carbon dioxide may also be used.
Hazards from combustion products:	Burning can produce carbon monoxide and/or carbon dioxide.
Special protective precautions and equipment for fire fighters:	<p>Highly flammable liquid. Contain spill. Full fire kit and breathing apparatus is required.</p> <p>Use water to cool exposed containers. Heating can cause expansion or decomposition leading to violent rupture of containers. If safe to do so, remove containers from path of fire.</p>

	Spills and leaks may be washed away with copious volumes of water, fog or spray. Prevent run-off from entering drains and watercourses.
HAZCHEM Code:	3YE

SECTION 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedure:	<p>In the event of a spill eliminate all sources of ignition and take measures to prevent static discharge. No smoking. Use water spray to disperse vapour.</p> <p>Clear area of all personnel not directly involved in the clean up.</p> <p>All personnel involved in the containment and disposal procedures to wear protective equipment as described in Section 8 to prevent skin and eye contamination and inhalation of vapours.</p> <p>Ventilate area well and ensure the atmosphere is safe before personnel return to the work area.</p>
Containment Procedure:	<p>Stop and contain the spill for salvage or absorb in inert absorbent material (e.g. Soil, sand, vermiculite) for disposal by an approved method. Prevent run-off into drains and waterways.</p> <p>If contamination of sewers or waterways has occurred, advise the local emergency services.</p>
Clean Up Procedure:	<p>Wash the cleaned-up area with copious volumes of water to remove any trace amounts of product. Spills can be converted to non-flammable mixtures by dilution with water.</p> <p>Non-returnable containers should be de-gassed prior to disposal. Dispose of all waste containers and used drums in accordance with local authority guidelines.</p>

SECTION 7: HANDLING AND STORAGE

Handling:	<p>Use in well ventilated areas away from all ignition sources. Intrinsically safe equipment only must be used in areas where this chemical is being used.</p> <p>The use of compressed air for filling, discharging, mixing or handling is prohibited due to the vapour hazard. Containers must be earthed to avoid generation of static charges when agitating or transferring product.</p>
Storage:	<p>Store in tightly closed containers in cool, dry, isolated and well-ventilated areas away from heat, sources of ignition and incompatibles (see below). Store away from oxidizing agents. Keep containers closed at all times - check regularly for leaks.</p> <p>Do not eat, drink or smoke in areas of use or storage. Observe State Regulations concerning the storage and handling of Dangerous Goods. Store with all precautions required for handling flammable liquids.</p> <p>The requirement of Australian Standard AS 1940 should be observed in addition to AS 1020, AS 1076, AS 2380 and AS 3000.</p> <p>Empty containers retain residue (liquid and/or vapour) and are dangerous. Do not pressure cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.</p>
Incompatibilities:	<p>Not to be stored with explosives (Class 1), flammable gases in bulk (Class 2.1), poisonous gases (Class 2.3), spontaneously combustible substances (Class 4.2), oxidizing agents (Class 5.1), organic peroxides (Class 5.2), radioactive substances (Class 7).</p> <p>Exemptions may apply.</p>

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards:	National Occupational Exposure Standard (NES), Safe Work Australia (formerly ASCC/NOHSC). Cyclohexane (amended 2001): TWA - 100 ppm (350 mg/m ³) STEL - 300 ppm (1050 mg/m ³)
Notes:	All occupational exposures to atmospheric contaminants should be kept to as low a level as is workable (practicable) and in all cases to below the National Standard. These exposure standards are guides to be used in the control of occupational health hazards. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity. TWA (Time Weighted Average): the time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers. STEL (Short-Term Exposure Limit): the average airborne concentration over a 15-minute period which should not be exceeded at any time during a normal eight-hour work day.
Biological Limit Values:	No biological limit allocated.
ENGINEERING CONTROLS	
<input type="checkbox"/> Ventilation:	Local exhaust ventilation and/or mechanical (general) exhaust is recommended where vapours are likely to be generated. All such equipment must be intrinsically safe.
<input type="checkbox"/> Special Consideration for Repair &/or Maintenance of Contaminated Equipment:	Empty containers retain residue (liquid and/or vapour) and are dangerous. Do not pressure cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. Vapour is heavier than air - prevent concentration in hollows or sumps. Do not enter confined spaces where vapour may have collected. Keep containers closed when not in use.
PERSONAL PROTECTION	
<input type="checkbox"/> Personal Hygiene	Protective clothing (gloves, coveralls, boots, etc.) should be worn to prevent skin contact. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storing or re-using.
<input type="checkbox"/> Skin Protection:	Avoid skin contact by the use of approved chemical resistant gloves and aprons - PVC or Neoprene (AS 2161).
<input type="checkbox"/> Eye Protection:	Avoid eye contact by wearing chemical goggles with side-shields or face-shield (AS/NZS 1336) whenever exposed to vapour or mist or if there is a risk of splashing liquid in the eyes. Safety showers with eye-wash should be provided in all areas where product is handled.
<input type="checkbox"/> Respiratory Protection:	None should be needed if engineering, storage and handling controls are adequate to ensure that atmospheric contamination is kept below the National Standard. Where vapour concentrations are likely to approach or exceed the National Standard, an approved organic vapour respirator (AS/NZS 1715 and 1716) must be worn.

	In high vapour concentrations, or in suspected oxygen-deficient atmospheres such as empty vessels or confined spaces, use air-supplied hood.
<input type="checkbox"/> Thermal Protection:	None should be needed under normal circumstances.
<input type="checkbox"/> Smoking & Other Dusts	Smoking must be prohibited in all areas where this product is used. See safety information on flammability above.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear colourless liquid with sweet pungent odour
Odour:	Detectable 0.6 ppm
pH, at stated concentration:	Not available
Vapour Pressure:	95 mm Hg @ 20°C
Vapour Density:	2.9 (air =1)
Boiling Point/range (°C):	79 - 81°C
Freezing/Melting Point (°C):	5.0 - 6.5°C
Solubility:	Insoluble
Specific Gravity (H₂O = 1):	0.779
FLAMMABLE MATERIALS	
<input type="checkbox"/> Flash Point:	-18°C
<input type="checkbox"/> Flash Point Method:	Not applicable
<input type="checkbox"/> Flammable (Explosive) Limit - Upper:	8.40%
<input type="checkbox"/> Flammable (Explosive) Limit - Lower:	1.3%
<input type="checkbox"/> Autoignition Temperature:	245°C
ADDITIONAL PROPERTIES	
<input type="checkbox"/> Evaporation Rate:	610 (n-Butyl Acetate = 100)
<input type="checkbox"/> Molecular Weight:	84.16
<input type="checkbox"/> Volatile Organic Compounds Content (VOC): (as specified by the Green Building Council of Australia)	100%
<input type="checkbox"/> % Volatiles:	100%

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability:	Stable
Incompatible Materials:	Will react with strong oxidizing agents. Cyclohexane is not compatible with oxidising agents (such as perchlorates, peroxides, permanganates, chlorates, nitrates, chlorine, bromine and fluorine) and nitrogen dioxide.
Conditions to avoid:	Heat, sparks, flame and build-up of static electricity.

Hazardous Decomposition Products:	Burning can produce carbon monoxide and/or carbon dioxide.
Hazardous Reactions:	Hazardous polymerisation will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological Data:

Acute toxicity:
 LD50/oral/rat: >5000 mg/kg
 LD50/dermal/rat: >2000 mg/kg
 LC50/inhalation/rat: >30 mg/l/4

Health effects information is based on reported effects in use from overseas and Australian reports.

Effects: Acute

Swallowed:	Unlikely under normal occupational exposures, but swallowing a minor amount may cause throat irritation, vomiting and diarrhoea. Dizziness and drowsiness may also occur. Ingestion of larger amounts may cause narcotic effects, and lead to coma and death. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.
Eyes:	Vapours may irritate the eyes. Liquids and mists may severely irritate or damage the eyes.
Skin:	Brief skin contact may cause minor and transient irritation
Inhaled:	Vapour may cause irritation of the nose, throat and upper respiratory tract. Higher concentrations can cause drowsiness, nausea, dizziness and eventually unconsciousness. Harmful if aspirated into the lungs, may cause chemical pneumonitis.

Effects: Chronic

Ingestion of larger amounts may cause narcotic effects, and lead to coma and death. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.
 Prolonged contact (e.g clothing saturated with the product) may cause drying and cracking of the skin due to the defatting action. Dermatitis may also occur in some individuals. This may lead to secondary infection.

Additional Notes

There is limited information suggesting that repeated and excessive over-exposure to cyclohexane may damage the liver and kidneys. Sensitising effects and mutagenic effects are not expected based on animal studies.

SECTION 12: ECOLOGICAL INFORMATION

Eco-toxicity:	Toxicity to fish (acute): LC50/Fathead minnow/: 4.53 mg/l/96 h Toxicity to daphnia: EC50/Daphnia magna/: 0.9 mg/l/48 h
Persistence and Degradability:	Degree of elimination: >70% Evaluation: Readily biodegradable
Mobility:	No data available

SECTION 13: DISPOSAL CONSIDERATIONS

Suitable for incineration by approved agent under controlled conditions if permitted by local authorities, otherwise disposal must be in accordance with local waste authority requirements.

Product must be contained and not disposed to sewerage systems, drains or waterways. Advise flammable nature. Empty containers must be decontaminated by rinsing with water.

SECTION 14: TRANSPORT INFORMATION

Proper Shipping Name:	CYCLOHEXANE
UN number:	1145
DG Class:	3
Subsidiary Risk 1:	None Allocated
Packaging Group:	II
HAZCHEM code:	3YE
Marine Pollutant:	No
Special Precautions for User:	Refer to incompatibilities in Section 7 and stability and reactivity information in Section 10.
ADDITIONAL TRANSPORT REQUIREMENTS:	
Nil	

SECTION 15: REGULATORY INFORMATION

Poisons Schedule:	Not scheduled
Other:	Nil

SECTION 16: OTHER INFORMATION**For further information on this product, please contact:**

Sucrogen BioEthanol Pty Ltd (ABN 85 009 660 191)

664 Lorimer St, Port Melbourne, Victoria, 3207, Australia

Phone: +61 3 9676 7200 or 1800 819 618 (applicable in Australia only)

Fax: +61 3 9676 7220 or 1800 647 260 (applicable in Australia only)

ADDITIONAL INFORMATION**Australian Standards References:**

AS 1020	The Control of Undesirable Static Electricity.
AS 1076	Code of Practice for selection, installation and maintenance of electrical apparatus and associated equipment for use in explosive atmospheres (other than mining applications) – Parts 1 to 13
AS/NZS 1336	Recommended Practices for Occupational Eye Protection
AS/NZS 1715	Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716	Respiratory Protective Devices

AS 1940	The Storage and Handling of Flammable and Combustible Liquids
AS 2161	Industrial Safety Gloves and Mittens (excluding electrical and medical gloves)
AS 2380	Electrical equipment for explosive atmospheres – Explosion Protection Techniques (Parts 1 to 9)
AS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules).

Other References:

NOHSC:2011(2003)	National Code of Practice for the Preparation of Material Safety Data Sheets 2nd Edition, April 2003, National Occupational Health and Safety Commission.
NOHSC; 2012 (1994)	National Code of Practice for the Labelling of Workplace Substances, March 1994, Australian Government Publishing Service, Canberra.
NES	National Occupational Exposure Standards for Workplace Atmospheric Contaminants (NES), Safe Work Australia (formerly ASCC/NOHSC) 1995 as amended.
ADG Code	Australian Dangerous Goods Code 7 th Edition.

AUTHORISATION

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END OF MSDS