Date of issue see below

MATERIAL SAFETY DATA SHEET

FOR

LIQUEFIED PETROLEUM GAS (LPGas)

which is classified as a "Dangerous Good" in accordance with the Australian Dangerous Goods Code and not classified as "Hazardous" according to the criteria of WorkSafe Australia.

Company Details

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AUSTRALIA

Phone: (02) 9927 3200
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24 Hour Emergency Phone Number
1800 819 783

IDENTIFICATION

Product Name:	LPGas	**UN NUMBER**
Other Names:	Propane, butane or a combination of these products	1075

Dangerous Goods Class:	2.1
Subsidiary Risk:	None
HAZCHEM Code:	2 WE
Poison Schedule Number(s):	None allocated
Use:	As an energy source in the residential, commercial and automotive markets and as a feedstock by the petrochemical industry.

Revision:	0	1	2	3				
Date:	May 96	July 97	Aug 01	Mar 02				

PHYSICAL DESCRIPTION/CHEMICAL PROPERTIES

PROPERTY	PROPANE		BUTANE	
Chemical Formula	**C_3H_8**		**C_4H_{10}**	
Molecular Weight	**44.1**		**58.1**	
Boiling Point	**-42^{0}C**		**-0.5^{0}C**	
	Liquid at 15^{0}C	Gas at 101 kPa & 15^{0}C	Liquid at 15^{0}C	Gas at 101 kPa & 15^{0}C
Density (kg/m^3)	510	1.86	568	2.47
Relative Density: water = 1.0	0.510		0.568	
air = 1.0		153		2.00
Litres/tonne	1961	536000	1760	405000
m^3/tonne	1.961	536	1.760	405
m^3/m^3 of liquid	1.000	274	1.000	235
Specific heat of liquid (kJ/kg/^{0}C)	2.512		2.386	
Latent heat of vapourisation (MJ/m^3)	232		239	
(MJ/kg = GJ/t)	0.358		0.372	
Heat combustion (MJ/m^3)	25000	93.3	28800	121.9
(MJ/kg = GJ/t)	50.1	50.1	49.47	49.47
Volume of air (m^3) needed to burn 1m^3 of gas		23.7		31.0
Flash point		-104^{0}C		-60^{0}C
Ignition temp.		493-549^{0}C		482-538^{0}C
Max. flame temp.		1970^{0}C		1990^{0}C
Limits of flammability in air (% by vol):				
upper %		9.6		8.6
lower %		2.4		1.9
Research Octane number:	100		92	

Other Properties:		LPGas is incompatible with strong oxidising agents, peroxides, chlorine and concentrated nitric acid. Hazardous polymerization will not occur.
Ingredients:		
Chemical names:		Propane Butane
Other name/numbers:	**Propane**	UN 1978
	Butane	UN 1011

CAS Numbers:			**EINECS NO:**
Main component:	Propane	0074 - 98 – 6	2008279
Minor components:	n-Butane	106 - 97 – 8	2034487
	Isobutane	75 - 28 - 5	
	Ethane	74 - 84 - 0	
	Ethylmercaptan	75 - 08 - 1	

HEALTH HAZARD INFORMATION

Health Effects

Acute:

Eye contact:	High vapour concentration may produce irritation. Contact with liquid may cause burns similar to frostbite and irritation.
Skin contact:	Contact by liquid can cause burns similar to frostbite and irritation.
By Ingestion:	Not applicable.
Inhalation:	Asphyxiant in high concentrations. At lower concentrations lack of oxygen will cause dizziness, nausea, increased depth and frequency of breathing and ultimately unconsciousness.

Chronic:

Carcinogenicity:	No known behaviour.
Mutagenicity:	No known behaviour.
Tetratogenicity:	No known behaviour.

First Aid:

Inhaled:	Remove patient to fresh air, lay down, rest.
Eye: (liquid contact)	Immediately hold eyes open and wash continuously with water for at least 15 minutes.
Cold Burns:	Place the person in a warm area as soon as possible. Quickly submerge the burn area in cool or warm water 33-35^{o}C max (NOT HOT) for five minutes. Maintain the injured part at room temperature, cover with sterile dressing and then cover in a blanket. Loosen any articles of clothing that may restrict blood circulation.

In all cases seek medical attention and see the Elgas Super Cold Contact Injuries Hospital Information Sheet for further information and procedures.

Advise to Doctor:	No specific treatment recommended, but must clearly state to medical personnel as to whether the injury was caused by an ignited source of LPGas product or from a super cold contact injury, ie. contact with LPGas product (unignited) in the liquid phase. Severe inhalation over exposure may sensitise the heart to catecholamine induced arrhythmias. Do not administer catecholamines to an overexposed person.

PRECAUTIONS FOR USE

Exposure Standards: The ingredients of LPGas have the following threshold limit values for both Time Weighted Averages (TLV - TWA) and Short Term Exposure Limits (TLV - STEL)

Ingredient	TLV - TWA	TLV - STEL	Other
Propane	Not applicable	Not applicable	Simple Asphyxiant
Butane (to EH40)	600ppm	750ppm	-
LPGas (to EH40)	1000ppm	1250ppm	-
Ethylmercapton	0.5ppm	-	-

Note: LPGas contains a stenching agent - ethyl mercaptan in an approximate concentration of 25ppm.

Engineering Controls:

- Cylinders should always be used in the upright position and in a well ventilated area. It should be noted however, that forklift cylinders (provided they are correctly installed on the vehicle) are designed to operate in the horizontal position.
- Most LPGas off-take valves are designed for vapour service but a check should always be made that the cylinder and valve arrangement has not been specifically designed for liquid service. Prior to making the connection check that the face of the coupling is not damaged and that the synthetic washer is in position and in good condition.
- Flexible hoses should be suitable for use with Liquefied Petroleum Gas (LP Gas) and be designed in accordance with AS 1869.
- Flexible hoses should have a nominal bore as small as possible and be of the shortest practical length to minimise the amount of product contained in the connection.
- Jointing compounds suitable for LPGas use or PTFE tape should be used for all other screwed connections. Hemp should never be used.
- LPGas installations shall be designed and installed in accordance with the latest editions of AS/NZS1596 and AS5601/AG601.
- As LPGas in the vapour phase is heavier than air, due consideration shall be given to the location of drains and depressions etc; when designing, installing or maintaining LPGas systems.
- When used as a cutting agent, consult the Elgas MSDS for RazorGas™.
- Customers must ensure that if any new non LPGas related plant is installed (such as lights, HVAC etc) then this is not installed close to the LPGas storage (see AS/NZS1596).

FLAMMABILITY

- LPGas is highly flammable and should always be used in well ventilated areas and care taken when preparing for use.
- A detector using a naked flame must NOT be used to detect LPGas if a leak is suspected.

PERSONNEL PROTECTION

Eye protection:	Chemical Safety Glasses with side shields or face shields complying with AS 1336/1337 and suitable for cutting operations.
Gloves:	Impervious cold and oil resistant gloves complying with AS 2161 shall be worn.
Respiratory protection:	If ventilation of the area is not sufficient, respiratory protection may be required. This should be least an approved air supplied facemask or self containing breathing apparatus where the exposure standard is likely to be exceeded or if work is required close to large gas leaks. Respiratory protection should comply with AS 1715/1716.

SAFE HANDLING

- Class 2.1 Flammable Gas products may only be loaded in the same vehicle or packed in the same freight container with the classes of products as permitted in the National Road Transport Commission Australian Dangerous Goods Code.
- LPGas cylinders shall be stored in accordance with the requirements of the Australian Dangerous Goods Code, AS 4332 and AS/NZS1596.
- Cylinders shall only be transported in an upright, secure position in accordance with the National Road Transport Commission Load Restraint Guide and shall not be dropped.
- Electrical equipment must conform to that specified in AS 1076 and AS 2430.
- Do not store in pits and basements where vapour may collect.
- Solid walls shall have low level ventilation.
- Store in approved, well-ventilated area, away from sources of heat and ignition.
- Store cylinders securely in an upright position.
- Store away from incompatible materials particularly oxidising agents.
- Pipe work and handling equipment shall be designed for the purpose.
- Check for leaks by sound and smell and by locating with soapy water or with approved detection system.
- Use only equipment designed for LPGas applications.
- Check vessels and cylinders are clearly labelled.
- Protect vessels, cylinders and valving against physical damage; whether full or empty.
- Do not contaminate cylinders with other products.
- Ensure that cylinders cannot be struck by forklift vehicles or by dropped or rolled objects, etc.

SPILLAGE AND DISPOSAL

- Shut off engines, electrical equipment and all other sources of ignition.
- Evacuate personnel away from the direction in which gas (being heavier than air) is likely to move.
- Stop leak if possible and safe to do so.
- If leak cannot be stopped move cylinder, if possible, to a safe unoccupied area outdoors and allow to empty.
- Disperse gas cloud with a water fog nozzle.
- Notify emergency services, if appropriate.
- If necessary, dispose of by allowing to vent into an open unoccupied area free from any source of ignition under the supervision of the emergency services where required.
- Close valves on empty containers.
- Return empty cylinders to supplier using the same precautions as with filled cylinders.

FIRE EXPLOSION HAZARD

- Alert fire brigade telling them location, material and quantity.
- Evacuate the area of persons not fighting the fire.
- Cut off source of gas if safe to do so.
- DO NOT EXTINGUISH BURNING GAS OTHER THAN BY CUTTING OFF SOURCE OF GAS SUPPLY; IF THIS IS NOT POSSIBLE LEAVE GAS TO BURN AND EVACUATE.
- Carbon monoxide fumes may be produced should burning occur within an enclosed space (ie. Causing a deficiency of oxygen).
- Use water spray nozzle where possible, both to cool cylinders and to disperse the gas.
- Fire fighters should wear full protective clothing and be aware of the risk of possible explosion (especially in a confined space).
- Vessels and cylinders are fitted with safety valves which will discharge gas if the containers are heated, but noting that the container may rupture even after the safety valve has lifted.
- Flashback may occur along vapour trail.
- Cool vessels or cylinders with water spray directing spray primarily onto the upper surface of the vessel.
- Do not approach a vessel or cylinder suspected to be hot.
- Where possible, remove cool cylinders from the path of the fire.
- Alert supplier (see 24 Hour Emergency Phone Number on Page 1 of 6).
- Do not re-use a fire-exposed vessel or cylinder seek advice of supplier.

OTHER INFORMATION

Ecological Information:

- LPGas hydrocarbons will photo-degrade under atmospheric conditions.

Contact Point:

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