

Product Name: LIQUIFIED PETROLEUM GAS (LPG)
Revision Date: 16 Apr 2015
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SAFETY DATA SHEET

SECTION 1**PRODUCT AND COMPANY IDENTIFICATION****PRODUCT**

Product Name: LIQUIFIED PETROLEUM GAS (LPG)
Product Description: Liquefied Hydrocarbon Gas
Product Code: 249011-88
Recommended Use: Fuel

Trade Names	Trade Names
ESSO GAS	LPG
SYNERGY LPG (AUTO LPG)	

COMPANY IDENTIFICATION

Supplier: ExxonMobil Asia Pacific Pte.Ltd. (Company No.: 196800312N)
1 HarbourFront Place
#06-00 HarbourFront Tower One
Singapore 098633

24 Hour Environmental / Health Emergency Telephone (1) 609-737-4411
Supplier General Contact (65) 6885 8000

SECTION 2**HAZARDS IDENTIFICATION**

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION:

Flammable gas: Category 1. Gas under pressure: Liquefied gas.

LABEL:**Symbol:**

Signal Word: Danger

Hazard Statements:

Physical: H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.

Precautionary Statements:

Prevention: P210: Keep away from heat/sparks/open flames/hot surfaces. -- No smoking.
 Response: P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: Eliminate all ignition sources if safe to do so.
 Storage: P410 + P403: Protect from sunlight. Store in a well-ventilated place.

Other hazard information:

PHYSICAL / CHEMICAL HAZARDS

Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Gas may be odorized. Continued exposure to odorized gas may reduce or eliminate ability to smell the odorant. People with impaired ability to detect odor due to colds, allergies, injuries, etc. must be especially cautious. Odor must not be used exclusively as a safety measure. Proper respiratory protection and fire/explosion precautions should be utilized when odor is first detected.

ENVIRONMENTAL HAZARDS

No significant hazards.

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3	COMPOSITION / INFORMATION ON INGREDIENTS
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This material is defined as a substance.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
LIQUEFIED PETROLEUM GAS	68476-85-7	> 99 %	H220, H280

Hazardous Constituent(s) Contained in Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
BUTANE	106-97-8	60 - 80%	H220, H280
ETHANE	74-84-0	0 - 5%	H220, H280, H402
ISOBUTANE	75-28-5	0 - 40%	H220, H280
ISOPENTANE	78-78-4	0 - 5%	H224, H304, H336, H401, H411
PROPANE	74-98-6	20 - 40%	H220, H280

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

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SECTION 4 FIRST AID MEASURES**INHALATION**

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. If frostbite occurs, immerse involved area in water at body temperature. Keep immersed for 20 to 40 minutes. Seek medical assistance.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Not Applicable

NOTE TO PHYSICIAN

This light hydrocarbon material, or a component, may be associated with cardiac sensitisation following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE FIGHTING MEASURES**EXTINGUISHING MEDIA**

Appropriate Extinguishing Media: Use water fog, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Allow the fire to burn under controlled conditions. Stop leak if you can do so without risk. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Flammable Gas. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-40°C (-40°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 2.0 UEL: 9.5
Autoignition Temperature: 410°C (770°F)

SECTION 6	ACCIDENTAL RELEASE MEASURES
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NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of the spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that provide chemical resistance and, when necessary, heat-resistance and/or thermal insulation are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Small spills: normal work clothes are usually adequate. Large spills: full body suit of chemical and thermal resistant material is recommended. Chemical goggles and face shield are recommended if contact with liquefied gas is possible.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning. Allow liquid to evaporate from the surface. Use water spray to reduce vapour or divert vapour cloud drift. All equipment used when handling the product must be grounded. Do not direct water at spill or source of leak. Do not touch or walk through spilled material. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Prevent spreading of vapour through sewers, ventilation systems and confined areas.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not confine in area of spill. Allow liquid to evaporate from the surface. See Land Spill section of the SDS for advice on gases.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7	HANDLING AND STORAGE
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HANDLING

Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from

static accumulation. Material can accumulate static charges which may cause an electrical spark (ignition source). Auto-refrigeration. Drains can be plugged and valves may become inoperable because of the formation of ice when expanding vapors or vaporizing liquids cause temperatures below the freezing point of water.

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source	Year
BUTANE		TWA	1900 mg/m3	800 ppm		Singapore PELs	2006
BUTANE		STEL	1000 ppm			ACGIH	2014
ISOBUTANE		STEL	1000 ppm			ACGIH	2014
ISOPENTANE		TWA	1000 ppm			ACGIH	2014
LIQUEFIED PETROLEUM GAS		TWA	1800 mg/m3	1000 ppm		Singapore PELs	2006

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
 Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate,

gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Thermally protective, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves.

Eye Protection: Face shield is recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Thermally protective and chemical resistant apron and long sleeves are recommended when volume of material is significant.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Gas
Form: Compressed or Liquified
Colour: Colourless
Odour: Odorless (may be odorized)
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.53 - 0.58
Flammability (Solid, Gas): N/D
Flash Point [Method]: <-40 °C (-40 °F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 2.0 UEL: 9.5
Autoignition Temperature: 410 °C (770 °F)
Boiling Point / Range: -89 °C (-128 °F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): 1.6 at 101 kPa
Vapour Pressure: > 133 kPa (1000 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): N/D

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pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: N/A
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidisers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 5000 ppm (Gas)	Minimally Toxic. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Not applicable.
Skin	
Acute Toxicity: No end point data for material.	Not applicable.
Skin Corrosion/Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for

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	the material. Test(s) equivalent or similar to OECD Guideline 471 474
Carcinogenicity: No end point data for material.	Not expected to cause cancer.
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 414 422
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for the material. Test(s) equivalent or similar to OECD Guideline 413 422

OTHER INFORMATION

For the product itself:

May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite (cold burn). Very high exposure (confined spaces / abuse) to light hydrocarbons may result in abnormal heart rhythm (arrhythmias). Concurrent high stress levels and/or co-exposure to high levels of hydrocarbons (above occupational exposure limits), and to heart-stimulating substances like epinephrine, nasal decongestants, asthma drugs, or cardiovascular drugs may initiate arrhythmias. Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate, incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at 21 percent by volume.

IARC Classification:

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1

2 = IARC 2A

3 = IARC 2B

SECTION 12

ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be readily biodegradable.

Atmospheric Oxidation:

Material -- Transformation due to atmospheric oxidation not expected to be significant.

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

ECOLOGICAL DATA

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results
Water	Ready Biodegradability	28 day(s)	Percent Degraded < 60 % weight: similar material

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
Hazard Class: 2
Hazchem Code: 2YE
UN Number: 1075
Packing Group: (N/A)
Label(s) / Mark(s): 2.1

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SEA (IMDG)

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
Hazard Class & Division: 2.1
EMS Number: F-D, S-U
UN Number: 1075
Packing Group: (N/A)
Marine Pollutant: No
Label(s): 2.1
Transport Document Name: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1, (-40.1 °C c.c.)

AIR (IATA)

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
Hazard Class & Division: 2.1
UN Number: 1075
Packing Group: (N/A)
Label(s) / Mark(s): 2.1
Transportation Limitations: CARGO AIRCRAFT ONLY
Transport Document Name: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1

SECTION 15 REGULATORY INFORMATION

Material is hazardous as defined by Specification for hazard communication for hazardous chemicals and dangerous goods (Singapore Standard SS586) Part 2:2014 - Globally harmonised system of classification and labelling of chemicals - Singapore's adaptations.

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

Workplace Safety and Health Act & Workplace Safety and Health (General Provisions) Regulations
MPA (Dangerous Goods, Petroleum and Explosives) Regulations
Fire Safety Act & Fire Safety (Petroleum and Flammable Materials) Regulations

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

H220: Extremely flammable gas; Flammable Gas, Cat 1
H224: Extremely flammable liquid and vapor; Flammable Liquid, Cat 1
H280: Contains gas under pressure; may explode if heated; Pressurized Gas
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H402: Harmful to aquatic life; Acute Env Tox, Cat 3
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

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THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:
Section 05: Hazardous Combustion Products information was modified.
Section 01: Alternate Product Names Table information was modified.

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