

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Chemical type	: Substance
Substance name	: Petroleum gases, liquefied
Trade name	: L.P.G. - Liquefied Petroleum Gas
EC index no	: 649-202-00-6
EC no	: 270-704-2
CAS No.	: 68476-85-7
REACH registration No.	: Not yet available
Product code	: 610,SDS # PbR0025
Chemical name	: Petroleum gases, liquefied
Synonyms	: Petroleum gas
Other means of identification	: [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C3 through C7 and boiling in the range of approximately -40 °C to 80 °C (-40 °F to 176 °F).]

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/preparation	: Manufacture of substances Formulation [mixing] of preparations and/or re-packaging Polymer preparations and compounds Fuels Functional fluids Blowing agent
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1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Petrobras International Braspetro B.V. – PIB BV
Prins Bernhardplein 200, 1097 – JB Amsterdam
The Netherlands

All communications shall be addressed exclusively to the following address:

Petrobras Europe Ltd
4th Floor, 20 North Audley Street
London W1K 6WL – United Kingdom
Fax number: +44(0) 20 7355 8750
E-mail: reach@petrobras.com.br

1.4. Emergency telephone number

Emergency number	: For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident Call CHEMTREC Day or Night Within USA and Canada: 1-800-424-9300 Outside USA and Canada (collect calls accepted): 1-703-527-3887
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SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Gas 1 H220
Liquefied gas H280
Muta. 1B H340
Carc. 1B H350

Full text of H-phrases: see section 16.

Classification according to Directive 67/548/EEC or 1999/45/EC

Carc.Cat.1; R45
Muta.Cat.2; R46
F+; R12

Full text of R-phrases: see section 16.

Adverse physicochemical, human health and environmental effects

Contains gas under pressure; may explode if heated. In high concentrations may cause asphyxiation. Contact with product may cause cold burns or frostbite. Contributes to the formation of photochemical smog by degradation in the atmosphere through photochemical reactions to form photochemical oxidants and interfering with the photochemical cycle of nitrogen oxides.

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2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

Hazard statements (CLP) :

H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
H340 - May cause genetic defects
H350 - May cause cancer

Precautionary statements (CLP) :

P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P281 - Use personal protective equipment as required
P308+P313 - IF exposed or concerned: Get medical advice/attention
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leaking gas fire, eliminate all ignition sources if safe to do so.
P410+P403 - Protect from sunlight. Store in a well-ventilated place

2.3. Other hazards

This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.

other hazards which do not result in classification

: Contact with product may cause cold burns or frostbite. In high concentrations may cause asphyxiation. Contributes to the formation of photochemical smog by degradation in the atmosphere through photochemical reactions to form photochemical oxidants and interfering with the photochemical cycle of nitrogen oxides.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Directive 67/548/EEC
Petroleum gases, liquefied (containing, 1,3-butadiene \geq 0.1%)	(CAS No.) 68476-85-7 (EC no) 270-704-2 (EC index no) 649-202-00-6	< 100	F+; R12 Carc.Cat.1; R45 Muta.Cat.2; R46
Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Petroleum gases, liquefied (containing, 1,3-butadiene \geq 0.1%)	(CAS No.) 68476-85-7 (EC no) 270-704-2 (EC index no) 649-202-00-6	< 100	Flam. Gas 1, H220 Muta. 1B, H340 Carc. 1B, H350 Liquefied gas, H280

Full text of R-, H- and EUH-phrases: see section 16.

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general	: Do not give an unconscious person anything to drink. Put victim at rest, cover with a blanket and keep warm.
First-aid measures after inhalation	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. In case of breathing difficulties administer oxygen. Give artificial respiration if necessary. Seek medical advice (show the label where possible).
First-aid measures after skin contact	: May cause frostbite. Remove contaminated clothing immediately and dispose off safely. Rinse thoroughly with plenty of water for at least 20 minutes and take medical advice.
First-aid measures after eye contact	: Rinse immediately and plentifully with water, also under the eyelids, for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical advice (show the label where possible).
First-aid measures after ingestion	: not applicable.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation	: May cause respiratory irritation. Asphyxiant gas. CNS depression.
Symptoms/injuries after skin contact	: Contact with product may cause cold burns or frostbite.
Symptoms/injuries after eye contact	: Contact with product may cause cold burns or frostbite.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

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SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media: : carbon dioxide (CO₂), dry chemical powder, foam. Water spray.
Unsuitable extinguishing media : Do not use water jet. Do not aim water directly at point where compressed gas is escaping, as the water may freeze.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Extremely flammable gas. Contains gas under pressure; may explode if heated.
Explosion hazard : Formation of potentially explosive mixtures with: Oxidizing agents. Chlorine (Cl₂). Direct sunlight.
Reactivity : Hazardous combustion products. Nitrogen oxides (NO_x). carbon oxides. Asphyxiant gas.

5.3. Advice for firefighters

- Firefighting instructions : Wear protective gloves/protective clothing. Cool tanks/drums with water spray/remove them into safety.
Protective equipment for firefighters : In case of fire: Wear self-contained breathing apparatus.
Other information : Cool containers / tanks with spray water if possible. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Evacuate personnel to a safe area. Under fire conditions closed containers may rupture or explode. Remove product from area of fire. Eliminate leaks immediately. Eliminate all ignition sources if safe to do so.

6.1.1. For non-emergency personnel

- Protective equipment : Refer to section 8.
Emergency procedures : This product is flammable. Remove all sources of ignition. Do not handle until all safety precautions have been read and understood.

6.1.2. For emergency responders

- Protective equipment : Wear suitable protective clothing, gloves and eye/face protection.
Emergency procedures : Evacuate unnecessary personnel. This product is flammable. Remove all sources of ignition.

6.2. Environmental precautions

Use water spray to minimise or disperse vapours. In case of insufficient ventilation and/or through use, explosive/highly flammable mixtures may develop.

6.3. Methods and material for containment and cleaning up

- For containment : Stop leak if safe to do so. Ventilate affected area.
Methods for cleaning up : Stop leak if safe to do so. Ventilate affected area. Use only non-sparking tools.
Other information : Remove all sources of ignition.

6.4. Reference to other sections

Refer to sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Extremely flammable liquefied gas. Handle in accordance with good industrial hygiene and safety procedures. Store in tightly closed, properly ventilated containers away from heat, sparks, open flame. Use only non-sparking tools. Avoid contact with skin, eyes and clothing.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures: : Use only in well-ventilated areas. Use explosion-proof ventilating equipment.
Storage condition(s) : Protect from sunlight. Keep container tightly closed in a cool, well-ventilated place. Protect containers against damage. Only use containers approved for especially this product.
Incompatible materials : Oxidizing agents. Chlorine (Cl₂). oxygen. butane. nickel tetracarbonyl, tetracarbonylnickel.
Maximum storage period : < 6 months
Storage area : Keep out of direct sunlight. Keep away from: humid air. Keep away from sources of ignition. Floors should be impenetrable, resistant to liquids and easy to clean.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Petroleum gases, liquefied (68476-85-7)

Belgium	Limit value (mg/m ³)	1826 mg/m ³
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Petroleum gases, liquefied (68476-85-7)		
Belgium	Limit value (ppm)	1000 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m ³)	1800 mg/m ³
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1800 mg/m ³
USA NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1800 mg/m ³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
Switzerland	VME (mg/m ³)	1800 mg/m ³
Switzerland	VME (ppm)	1000 ppm
The Netherlands	MAC TGG 8H (mg/m ³)	1800 mg/m ³
The Netherlands	MAC TGG 8H (ppm)	1000 ppm
United Kingdom	WEL TWA (mg/m ³)	1750 mg/m ³
United Kingdom	WEL TWA (ppm)	1000 ppm
United Kingdom	WEL STEL (mg/m ³)	2180 mg/m ³
United Kingdom	WEL STEL (ppm)	1250 ppm
Czech Republic	Expoziční limity (PEL) (mg/m ³)	1800 mg/m ³
Czech Republic	Expoziční limity (PEL) (ppm)	610.2 ppm
Czech Republic	Expoziční limity (NPK-P) (mg/m ³)	4000 mg/m ³
Czech Republic	Expoziční limity (NPK-P) (ppm)	1356 ppm
Czech Republic	Remark (CZ)	*
Ireland	OEL (8 hours ref) (mg/m ³)	1800 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	1000 ppm
Ireland	OEL (15 min ref) (mg/m ³)	2250 mg/m ³
Ireland	OEL (15 min ref) (ppm)	1250 ppm
Canada (Quebec)	VEMP (mg/m ³)	1800 mg/m ³
Canada (Quebec)	VEMP (ppm)	1000 ppm
Australia	TWA (mg/m ³)	1750 mg/m ³
Australia	TWA (ppm)	1000 ppm
Australia	STEL (ppm)	1250 ppm

Butadiene 1,3 (106-99-0)		
Austria	MAK (mg/m ³)	11 mg/m ³
Austria	MAK (ppm)	5 ppm
Austria	MAK Short time value (mg/m ³)	44 mg/m ³
Austria	MAK Short time value (ppm)	20 ppm
Belgium	Limit value (mg/m ³)	4.5 mg/m ³
Belgium	Limit value (ppm)	2 ppm
Belgium	Remark*	c
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m ³)	4.4 mg/m ³
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	2 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	1 ppm
USA OSHA	OSHA PEL (STEL) (ppm)	5 ppm
Spain	VLA-ED (mg/m ³)	4.5 mg/m ³
Spain	VLA-ED (ppm)	2 ppm
Switzerland	VME (mg/m ³)	11 mg/m ³
Switzerland	VME (ppm)	5 ppm
The Netherlands	MAC TGG 8H (mg/m ³)	46.2 mg/m ³
United Kingdom	WEL TWA (mg/m ³)	22 mg/m ³
United Kingdom	WEL TWA (ppm)	10 ppm
Denmark	Grænseværdie (langvarig) (mg/m ³)	22 mg/m ³
Denmark	Grænseværdie (langvarig) (ppm)	10 ppm
Denmark	Grænseværdie (kortvarig) (mg/m ³)	44 mg/m ³
Denmark	Grænseværdie (kortvarig) (ppm)	20 ppm
Finland	HTP-arvo (8h) (mg/m ³)	2.2 mg/m ³

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Butadiene 1,3 (106-99-0)		
Finland	HTP-arvo (8h) (ppm)	1 ppm
Hungary	CK-érték	1 mg/m ³
Ireland	OEL (8 hours ref) (mg/m ³)	2.2 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	1 ppm
Ireland	Notes (IE)	C1, Mut2
Lithuania	IPRV (mg/m ³)	1 mg/m ³
Lithuania	IPRV (ppm)	0.5 ppm
Lithuania	TPRV (mg/m ³)	10 mg/m ³
Lithuania	TPRV (ppm)	5 ppm
Lithuania	Remark (LT)	K
Norway	Gjennomsnittsverdier (AN) (mg/m ³)	2.2 mg/m ³
Norway	Gjennomsnittsverdier (AN) (ppm)	1 ppm
Norway	Merknader (NO)	K
Poland	NDS (mg/m ³)	10 mg/m ³
Poland	NDSCh (mg/m ³)	40 mg/m ³
Sweden	nivågränsvärde (NVG) (mg/m ³)	1 mg/m ³ 0.5 mg/m ³ C
Sweden	nivågränsvärde (NVG) (ppm)	0.5 ppm 1 ppm C
Sweden	kortidsvärde (KTV) (mg/m ³)	10 mg/m ³ 5 mg/m ³ C
Sweden	kortidsvärde (KTV) (ppm)	5 ppm 10 ppm C
Canada (Quebec)	VEMP (mg/m ³)	4.4 mg/m ³
Canada (Quebec)	VEMP (ppm)	2 ppm

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DNEL/DMEL (Workers)

Long-term - systemic effects, dermal : 23.4 mg/kg bodyweight/day

Long-term - systemic effects, inhalation : 2.21 mg/m³/day

DNEL/DMEL (General population)

Long-term - systemic effects, inhalation : 0.0664 mg/m³/day

8.2. Exposure controls

Appropriate engineering controls	: Use explosion-proof ventilating equipment. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection	: Protective gloves made of PVC.
Eye protection	: Chemical goggles or safety glasses. Don't wear contact lenses.
Skin and body protection	: Wear suitable protective clothing.
Respiratory protection	: An approved organic vapour respirator/supplied air or self-contained breathing apparatus must be used when vapour concentration exceeds applicable exposure limits.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Colour	: colourless.
Odour	: characteristic. rotten eggs.
Odour threshold	: No data available
pH	: No data available
Melting point	: No data available
Solidification point	: No data available
Boiling point	: 2 °C
Flash point	: No data available
Relat. evapor. rate comp. to butylacetate	: No data available
Flammability (solid, gas)	: No data available
Explosive limits	: Propane 2.2-9.5% Butane 1.9-8.5% vol %

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Vapour pressure	: < 15 Kgf/cm ² @ 37.8°C
Relative vapour density at 20 °C	: Propane 1.56 Butane 2.046
Relative density	: 0.5-0.6 g/cm ³
Solubility	: Soluble in organic solvents. Water: insoluble
Log Pow	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available

9.2. Other information

VOC content	: 100 %
Gas group	: Liquefied gas

SECTION 10: Stability and reactivity

10.1. Reactivity

Hazardous combustion products. Nitrogen oxides (NOx). carbon oxides. Asphyxiant gas.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use. No polymerization .

10.3. Possibility of hazardous reactions

Explosive with contact with : nickel tetracarbonyl, tetracarbonylnickel. oxygen. butane.

10.4. Conditions to avoid

Keep away from heat.

10.5. Incompatible materials

Oxidizing agents. Oxygen. nickel tetracarbonyl, tetracarbonylnickel. butane.

10.6. Hazardous decomposition products

On burning: release of (highly) toxic gases/vapours. carbon oxides. Asphyxiant gas.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

L.P.G. - Liquefied Petroleum Gas (68476-85-7)

LC50 inhalation rat (mg/l)	> 31 mg/l/4h
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Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : May cause genetic defects.

Carcinogenicity : May cause cancer.

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

L.P.G. - Liquefied Petroleum Gas (68476-85-7)

NOAEL (inhalation, rat, gas, 90 days)	10000 ppmV/6h/day
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Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : High concentration of vapours may induce: headache, nausea, dizziness. May cause irritation to the respiratory tract and to other mucous membranes.

Other information : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Not harmful to aquatic organisms.

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LC50 fishes	> 24.11 mg/l 96 hours
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L.P.G. - Liquefied Petroleum Gas (68476-85-7)	
LC50 daphnia	> 14.22 mg/l 48 hours
ErC50 (algae)	> 7.71 mg/l 96 hours

12.2. Persistence and degradability

L.P.G. - Liquefied Petroleum Gas (68476-85-7)	
Persistence and degradability	Product is biodegradable.

12.3. Bioaccumulative potential

L.P.G. - Liquefied Petroleum Gas (68476-85-7)	
Bioaccumulative potential	not bioaccumulative.

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

L.P.G. - Liquefied Petroleum Gas (68476-85-7)	
This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.	

12.6. Other adverse effects

Other adverse effects : Contributes to the formation of photochemical smog by degradation in the atmosphere through photochemical reactions to form photochemical oxidants and interfering with the photochemical cycle of nitrogen oxides.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Consult the appropriate authorities about waste disposal. Dispose of this material and its container to hazardous or special waste collection point.

Waste disposal recommendations : Handle empty containers with care because residual vapours are flammable. Disposal must be done according to official regulations.

SECTION 14: Transport information

In accordance with ADR / RID / ADN / IMDG / ICAO / IATA

14.1. UN number

UN-No. : 1075

14.2. UN proper shipping name

Proper shipping name : PETROLEUM GASES, LIQUEFIED
Transport document description : UN 1075 PETROLEUM GASES, LIQUEFIED, 2.1, (B/D)

14.3. Transport hazard class(es)

Class (UN) : 2
Hazard labels (UN) : 2.1



14.4. Packing group

Packing group (UN) : Not applicable

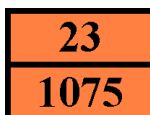
14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

14.6.1. Overland transport

Hazard identification number (Kemler No.) : 23
Classification code : 2F
Orange plates :



Tunnel restriction code : B/D
Limited quantities (ADR) : LQ00
Excepted quantities (ADR) : E0

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14.6.2. Transport by sea

No additional information available

14.6.3. Air transport

No additional information available

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No ingredients included in the REACH Candidate list

VOC content : 100 %

Other regulations, restrictions and prohibition regulations : Compliance with following regulations: Regulation (EC) 1907/2006 as amended. Regulation (EC) 1272/2008 as amended. Directive 67/548/EEC as amended. Directive 1999/45/EC as amended.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

Chemical safety assessment has been established in the attachment.

SECTION 16: Other information

Sources of Key data : PETROBRAS. MSDS.

Abbreviations and acronyms : CLP - Classification, Labelling and Packaging. SDS - Safety Data Sheet . REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals. ASTM - American Society for Testing and Materials . CSR - Chemical Safety Report. EC - European Community. EEC - European Economic Community. GHS - Globally Harmonised System.

Full text of R-, H- and EUH-phrases:

Carc. 1A	Carcinogenicity Category 1A
Carc. 1B	Carcinogenicity Category 1B
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
Muta. 1B	flammable liquids Category 1 flammable liquids Category 3
Press. Gas	Gases under pressure
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated
H340	May cause genetic defects
H350	May cause cancer
R12	Extremely flammable.
R45	May cause cancer.
R46	May cause heritable genetic damage.

SDS PETROBRAS USES

The information presented in this Safety Data Sheet is based on current knowledge and is believed to be complete and accurate. It describes the product for the purposes of health, safety and environment requirements only and shall, therefore, be used only as a guide. The data refers to a specific product and may not be valid for combined uses with other products. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. Petrobras shall not be responsible for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices.