

<b>MATERIAL SAFETY DATA SHEET</b> (EC Regulations 1272/2008 and 1907/2006, as amended)	<b>Revision: 22/10/2010</b> <b>Previous issue: 16/10/2006</b>
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**1. PRODUCT IDENTIFICATION AND COMPANY NAME**

- 1.1. Product identification;**                      **Liquefied petroleum gas**  
**CGV100** 100 g., 190 ml.  
**CGV210L** 210 g., 380 ml.  
**CGV220** 220 g., 400 ml.  
**CGV330L** 330 g., 600 ml.  
**CGV425** 425 g., 770 ml.
- 1.2. Product use:**                                      Combustible gas cartridge for welding and refilling of professional and household portable equipment.
- 1.3. Company name**                                      PROVIDUS Srl  
 Corso Piemonte 20  
 10088 - Volpiano (TO) - Italy  
 Tel. +39.011.9882245 - Fax +39.011.9953239  
 E-mail : info@providusit.com - Web site : www.providusit.com
- 1.4. Emergency contact:**                              PROVIDUS Srl +39.011.9882245 (working hours)

**2. HAZARDS IDENTIFICATION**

**2.1. Hazards classification:**

According to (EC) Regulation n. 1272/2008:  
 - Compressed gas  
 - Highly flammable gas (cat. 1)

According to Directive 67/548/EEC, Directive 1999/45/EEC, as amended, and in conformity with national implementation decrees:  
 - Extremely flammable (R12), symbol F+

**2.2. Labelling**

Pictogram



Warning

Danger

Hazards identifications:

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

Precautionary statements:

P210                                      Keep away from heat/sparks/open flames/hot surfaces — No smoking.

P377                                      Leaking gas fire: do not extinguish unless leak can be stopped safely.  
 P381                                      Eliminate all ignition sources if safe to do so.  
 P403                                      Store in a well ventilated place.

### 2.3. Other hazards

#### Health & Safety hazards:

Direct spray of liquid gas on skin and into eyes may cause freezing of skin areas and conjunctiva. The release or the presence of gas in confined spaces may cause asphyxiation; keep oxygen concentration over 17% (standard value = 20.9%).

In case of lack of oxygen, incomplete gas combustion may result in the formation of carbon monoxide, which is a toxic gas.

Inhalation of pure gas, may depress the activity of the central nervous system and cause drowsiness and dizziness. May cause heart sensitization (arrhythmia) by prolonged exposure.

#### Environmental Hazards:

Gas is a volatile organic compound (VOC) and, as such, it is subject to photo-chemical reactions that generate hazardous pollutants (ozone, organic nitrates)

### 3. COMPOSITION AND INFORMATION ON INGREDIENTS

Liquefied petroleum gas (odorized mixture of combustible gases; in the liquid state, gas is pressurized).  
Does not contain 1,3-butadiene (<0,1%).

Hazardous components in product	Concentration (% of weight)	CAS No.	CE No.	CE Index No.	Classification
isobutane / n-butane	70	68476-85-7	270-704-2	649-202-00-6	H280 -Press. Gas. - GHS04 H220 - Flam. Gas 1 – GHS02 F+; R12
propane	30				

### 4. FIRST AID MEASURES

**Inhalation** : remove victim to fresh air, away from contaminated area; in presence of asphyxiating atmosphere, wear suitable breathing apparatuses while helping the victim. Do not wear objects which can cause explosions. Make victim breathe fresh air and get medical attention immediately. If respiratory difficulty develops, take proper first aid actions

Symptoms associated with gas and vapour absorption (drowsiness, flickering vision, possible arrhythmia) may take place later on. Seek medical aid as soon the first symptoms appear and provide the physician with the product label or the MSDS.

**4.2. Skin contact** : if contact with the liquid product has occurred, immerse chilled part into water for about 5 minutes; do not use hot water. Do not rub.

If injury of the skin tissue has occurred, seek medical attention.

**4.3. Eye contact** : if contact with the liquid product has occurred, flush eyes immediately with plenty of water for at least 15 minutes taking the precaution to keep eyelid up; do not use hot water, do not rub.

If eye irritation develops or impaired vision or eye damage are observed, seek medical attention.

**4.4. Ingestion** : accidental ingestion of the product is unlikely due to the high volatility of the product. May cause, however, severe damage (freezing) to mucous membranes and tissue of mouth, oesophagus and stomach. In the event of ingestion, do not induce vomiting and obtain immediate medical attention..

### 5. FIRE FIGHTING MEASURES

#### 5.1. Means of extinction

Suitable extinguishing means: carbon dioxide, foam, chemical powder.

Unsuitable extinguishing means: full-jet water.

#### 5.2. Special hazards deriving from substance or mixture

Container may explode if exposed to heat/fire. This can result in the generation of irritant fumes and toxic gases (carbon monoxide) and projection of metal parts.

### **5.3. Recommendations addressed to personnel charged with fire extinction operations.**

Never extinguish a fire if you are not sure to be able to immediately stop gas escape, meaning that you are not sure that gas leaking out will not catch fire again : it is far better to have a sudden gas leak with ignition than a gas cloud moving toward an ignition source. Call for intervention of fire department if you are not sure to be able to extinguish fire promptly with the extinguishing media you have handy..

Always bear in mind that, when released, the product is heavier than air and, as such, it tends to stay close to the ground.

Use atomized water to cool down containers exposed to fire. Limit fire entity.

In case of fire, use suitable respiratory equipment of approved type (type EN 137) and wear protective gloves and special protection clothing.

## **6. ACCIDENTAL RELEASE MEASURES**

### **6.1. Personal precautions, protection devices and emergency procedures**

Personnel who do not intervene directly: check for risks of explosions (presence of ignition sources, damaged containers), remove ignition sources and assure proper ventilation of work place. Warn people in the vicinity, in a special way those located leeward, of the gas leak and risk of fire and explosion. Always bear in mind that gas is heavier than air and tends to deposit at ground level.

Put in place the procedures prescribed by the emergency plan. In the event of serious accident (law decree 17/08/1999, n. 334 as amended) promptly inform local authorities.

Personnel who intervene directly: wear personal protective clothing and personal protective equipment to avoid risk of inhalation and skin and eye contact. Strictly adhere to the emergency procedure (refer to point 8)..

Always bear in mind that gas is heavier than air and tends to stay close to the ground. When released in air, gas may generate an explosive atmosphere even in presence of a minimum ignition source. Containers exposed to heat source may explode.

**6.2. Environmental precautions** : contain/soak up product spill/spills with absorbent materials. Do not allow residual liquids to enter sewers or waterways. Refer to points 12 and 13.

**6.3. Reclamation methods** : if product has not volatized, contain and soak up product spill/spills with absorbent material (sand, sepiolite, cement, saw dust). Do not use metal tools while performing these operations. Let contaminated materials in open air before disposing of them. Refer to points 12 and 13.

## **7. HANDLING AND STORAGE**

### **7.1. Handling :**

Product may generate explosive atmospheres. Containers are to be handled with care.

Assure adequate ventilation of work premises or, in any case, of the place where the product is being used. .

Smoking in this area is to be prohibited. Do not spray gas on a naked flame or any incandescent material .

Avoid any risk of physical damage to gas containers (corrosion, accidental falls, mechanical action)..

Regularly check for gas leaks (use water and soap solution) and keep away from ignition sources (flames, sparks, ionizing radiations, laser radiations, micro-waves, static electricity).

Avoid contact of compressed and liquefied gas (sprays) with skin and eyes. Do not breathe gas nor gases resulting from combustion (use personal protective equipment indicated under point 8).

Do not eat, drink or smoke while handling and/or using the product.

**7.2. Storage** : store gas bottles in original, tightly closed containers, at dry and cool premises and at a temperature lower than 50°C and away from heat sources/flames/sparks.

Store combustible gas containers in well ventilated premises, separate from premises where oxidizing or burning products are stored (oxygen, nitrous oxide). Keep away from deposits of incompatible substances indicated under point10.

**7.3. Special applications** : it is strongly recommended NOT to use the product for purposes other than those indicated under the sub-point 1.2.

Follow the technical instructions for safe use of the product (refer to point 16). Carefully read and understand the instructions for cartridge installation before use.

## 8. PERSONAL PROTECTION, EXPOSURE CONTROL

8.1. **Exposure limit values** : avoid exposure to ambient concentrations higher than :

- 1000 ppm (v/v) TWA – for alyphatic hydrocarbons C1-C4 (propane, butane, isobutane) - ACGIH, 2009;
- 800 ppm (v/v) TWA – for n-butane and isobutane– NIOSH-, 2001
- 2100 ppm (v/v) IDLH - propane (NIOSH, 1994)
- 25 ppm (v/v) TWA- for carbon monoxide (n. CAS 630-08-0) - ACGIH, 2009.

8.2.1. **Exposure control for professional use of the product:** assess risks according to what provided for by the law decree 81/2008 as amended. These regulations provide for the use of the following protection equipment with special instructions supplied by the manufacturer of the protective equipment :

**Respiratory organs:** in the event of insufficient ventilation, wear a complete mask with filter against organic vapours (type EN 136) or, even better, a breathing apparatus (type EN 137) with full mask..

**Hands** : wear thermo-insulating gloves (type EN 511). Glove surface cooling up to - 50°C .

**Eyes** : goggles (type EN 166), face shield.

**Skin** : work clothing (type EN 340).

8.2.2. **Environmental exposure control** : Operate only in a work area equipped with exhaust ventilation systems and appropriate fire extinguishing means (fire extinguishers)..

Refer to regulations in force concerning the environmental pollution prevention – Law decree 03/04/2006, n. 152 as amended.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

- |  |  |
|--|--|
| a) <b>Physical state</b> :                             | Liquid under pressure, gas at 15,6 °C and 1 bar. Colourless.   |
| b) <b>Odour</b> :                                      | Typical of odorized, combustible gases (not troublesome)   |
| c) <b>Odour threshold</b>                              | n-butane: in the range 2.9 and 14.6 mg/m <sup>3</sup>  |
| d) <b>pH at 20 °C</b> :                                | Not pertinent  |
| e) <b>Freezing point</b> :                             | Lower than -130 °C   |
| f) <b>Boiling point</b> :                              | - 0.5 °C   |
| g) <b>Flammability point:</b>                          | - 74 °C.   |
| h) <b>Evaporation rate</b>                             | The liquid evaporates quickly in air causing instant freezing of surfaces with which it comes into contact.  |
| i) <b>Flammability</b>                                 | Flammable gas if in contact with air (at 20 °C and 101,3 kPa)  |
| j) <b>Upper/lower flammable limits</b>                 | Flammable gas/air mixtures may explode if gas concentration lies in the range between lower limit (LIE) and upper limit (LSE) of explosiveness :<br>n-butane : LIE = 1.8% and LSE = 8.4%<br>isobutane : LIE = 1.8% and LSE = 9.8%<br>propane : LIE = 2.2% and LSE = 10%. |
| k) <b>Vapour pressure:</b>                             | n-butane : 1820 mmHg at 25 °C<br>isobutane : 2611 mmHg at 25 °C<br>propane : 7150 mmHg at 25 °C  |
| l) <b>Relative vapour density:</b>                     | n-butane and isobutane: 2.07 (air=1)<br>propane: 1.56 (air=1)  |
| m) <b>Relative density:</b>                            | n-butane and isobutane: 0.6 (water=1)<br>propane: 0.5 (water=1)  |
| n) <b>Solubility</b> :                                 |  |
| <b>Solubility in water</b> :                           | n-butane : 61.2 mg/l at 25 °C<br>isobutane : 48.9 mg/L at 25 °C<br>propane : 62.4 ppm at 25 °C   |
| <b>Lipid solubility</b> :                              | Soluble in ether, chloroform   |
| o) <b>Coefficient of n-octanol/water distribution)</b> | Log Kow in the range 2.36 and 2.89   |
| :  |  |
| p) <b>Auto-ignition temperature</b>                    | 405 °C.  |
| q) <b>Decomposition</b>                                | No univocal data available in scientific literature  |

	<b>temperature</b>	
r)	<b>Viscosity :</b>	n-butane : 0.30 cSt at 20 °C (liquid) propane : 0.20 cSt at 20 °C (liquid)
s)	<b>Combustible properties</b>	none
t)	<b>Critical temperature</b>	n-butane: 153.2 °C isobutane: 134.69 °C propane: 96.81 °C
u)	<b>Critical pressure</b>	butane: 35,7 atm isobutane: 35,82 atm propane: 42,01 atm

## 10. STABILITY AND REACTIVITY

**10.1. Reactivity and hazardous conditions :** bursting or opening of container under unsuitable storage conditions may cause instant formation of explosive atmosphere (refer to point 10.3).

**10.2. Stability :** strong heating of containers causes their quick decompression and gas leakage. For handling instructions, please refer to points 7 and 16. Also refer to point 10.4.

**10.3. Conditions to avoid:** do not expose gas containers to direct sunlight and heat sources. Take adequate measures to avoid this condition. Do not expose to temperatures higher than 50 °C; avoid any conditions which may cause corrosion and rupture of containers.

**10.5. Incompatible substances:** avoid contact with strong oxidizing agents (hypochlorites, nitrates, perchlorates, permanganates, bicromate) which may generate a strong reaction. Product may react violently with comburent substances (peroxides, chlorine dioxide, nitrogen dioxide). Avoid contact with halogens, chlorine, fluorine and acetylene (risk of strong, explosive exothermic reactions). The addition of nickel carbonyl to n-butane and oxygen mixture may cause explosion at 20-40 °C.

**10.5. Hazardous decomposition products :** toxic gases (carbon monoxide) and highly flammable gases (hydrogen, ethylene), irritant carbonaceous fumes.

## 11. TOXICOLOGICAL INFORMATION

No experimental data available on the mixture.

### Acute toxicity :

**Inhalation** n-butane – EC50= 658 mg/l/4 h (rats) – data from studies on man not conclusive  
isobutane – EC50=570000 ppm (rats) – data from studies on man not conclusive  
propane – EC50=280000 ppm (rats) - data from studies on man not conclusive

**Ingestion:** data not available (technically impossible to experiment with conventional methods)

**Contact with skin/eyes:** data from studies on man indicates that this effect is not present

### Irritation

**Inhalation** n-butane – data from studies on man not conclusive  
isobutane - data from studies on man not conclusive  
propane – irritation in concentrations of 100,000 ppm – data not conclusive

**Ingestion:** data not available (technically impossible to experiment with conventional methods)

**Contact with skin/eyes:** data from studies on man indicate that this effect is not present

**Corrosivity:** data from studies on man indicate that this effect is not present (contact with the liquid phase of product causes frostbites)

**Sensitisation:** no data available

**Toxicity under repeated contact:** data from studies on man indicate that this effect is not present

**Carcinogenicity, mutagenicity and reproductive toxicity** no conclusive evidence (man, animals) exists that product may cause cancer or mutation or that it may impair fertility (teratotoxicity, embryotoxicity)

**Associated symptoms :**

Inhalation: inhalation of mists containing product particles may cause irritation of mucous membranes and apnea..

Absorption of gas causes narcotic effects (depression of central, nervous system). May cause dizziness or asphyxia with no forewarning symptoms. Effects on lungs and heart (arrhythmia, heart attack) may be associated to the highest exposures (1% - 10% in air).

Contact with eyes and skin: risk of freezing and injury to skin/eye tissue in case of contact with the liquid phase of the product.

Ingestion: product in its liquid phase causes the instant freezing of part. May cause serious damage to the mucous membranes and tissue of mouth, oesophagus and stomach.

## **12. ECOLOGICAL INFORMATION**

No experimental data available on the mixture.

**12.1. Toxicity** : the product does not contain any substances for which conclusive evidence exists that they may be harmful to environment..

**12.2. Persistency and degradability** : the product does not seem to damage the active sludge of biological depuration plants. The organic substances contained in product are biodegradable.

**12.3. Bio-accumulation potential** : Bio-accumulation factors (Log BCF in the range 1.56 - 1,78, calculated for substances contained in the product) suggest that bio-concentration is potentially moderate; in this case too, thanks to the poor solubility of gas in water, volatilization in air is the predominant process.

**12.4. Mobility on ground** : : the product spreads in soil layers, water and air.

**12.5. Other adverse effects** : Emission in air of hydrocarbons and organic solvents contribute to the creation of ozone layer, which is a hazardous gas to environment , and to the formation of organic nitrates.

## **13. DISPOSAL CONSIDERATIONS**

Waste containing product residuals is to be considered harmful because of product flammability and possibility of formation of explosive atmospheres.

Do not compact product to be disposed of; do not damage product containers.

For product to be disposed of, observe same safety regulations as for new, unused product. Do not pierce nor incinerate gas containers.

Waste (product and contaminated packaging) should be handed over to qualified and authorized waste contractors for disposal as hazardous, flammable waste materials..

Refer to regulations in force for the disposal of hazardous waste (Law decree 152/2006 as amended, consolidated Act on Environment).

## **14. INFORMATION ON TRANSPORT**

### **Carriage by road and railways ADR / RID (2009):**

ADR / RID Class: 2

Classification code: 5F

UN Number: 2037

UN proper shipping name: Small-capacity receptacles containing gas (gas cartridges) – without a release device, non-refillable

Hazard label: 2.1

Packing group: -

Description of goods: Non-reusable cartridge containing gas under pressure.

### **Transport by sea IMDG (2008 amdt 34-08):**

IMDG Class : 2

UN Number : 2037

UN proper shipping name: Small-capacity receptacles containing gas (gas cartridges) – without a release device, non-refillable

Hazard label: 2.1

Packing group: -

EMS Number : F-D, S-U

Marine pollutant : No

Description of goods : Non-reusable cartridge containing gas under pressure.

#### **Transport by air ICAO / IATA (2009):**

ICAO / IATA Class : 2.1

UN Number : 2037

UN proper shipping name: Small-capacity receptacles containing gas (gas cartridges) – without a release device, non-refillable

Hazard label : 2.1

Packing group: -

Description of goods : Non-reusable cartridge containing gas under pressure.

Pkg inst Y203 (Ltd Qty)

Pkg inst 203

ERG 10L

EQ: E0

#### **15. REGULATORY INFORMATION**

**Limitations to trade and use** : none according to Annex XVII of EC Regulation 1907/2006 as amended.

**Risk of important accident**: product listed, for its flammable properties, in Annex 1, part 2, of the Law decree 334/1999. Save as expressly provided for by Standard in the application field and exclusions of the standard itself, please refer to art. 6, 7 or 8 of the a.m. standard for storage of product quantities higher than those indicated in this Annex.

This MSDS has been drawn in conformity with the indications given in Annex II of EC Regulation 453/2010, in application of art.3 (parag. 2) of Regulation itself.

#### **16. OTHER INFORMATION**

**Information on the present revision**: each section of this MSDS was revised further to the updating of the Standard and following the information concerning safety and health of workers and environmental protection. In particular, classification and labelling were revised in order to conform them to the EC Regulation 1272/2008 and amendments of EC Regulation 1907/2006 in relation to the new contents and form demanded for MSDS.

#### **Classification and labelling according to Directives 67/548/CEE and 1999/45/CE:**

**Symbol** F+

#### **R-phrases**

R 12 Extremely flammable.

#### **S-phrases**

S 2 Keep out of reach of children .  
S 9 Store container in a well ventilated place.  
S 15 Store away from heat sources .  
S 16 Keep away from flames/sparks/ignition sources – No smoking .  
S 23 Do not inhale gas  
S 25 Avoid contact with eyes.  
S 33 Avoid electrostatic charges build-up.  
S 38 In case of poor ventilation, wear an adequate respiratory apparatus.

S 45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 51	Use only in well ventilated areas
S 53	Avoid exposure – make special instructions available before use
S 7/47	Keep container tightly closed and at temperature not higher than 50°C (to be indicated by the manufacturer).
S 20/21	Do not eat, drink nor smoke during use.
S 37/39	Wear suitable gloves. Protect eyes and face

**Main sources of data used to draw up this MSDS :**

- MSDS of raw materials.
- National Institute for Occupational Safety and Health (NIOSH, USA) : Registry of Toxic Effects of Chemical Substances, 2006.
- American Conference of Governmental Industrial Hygienists (ACGIH), 2009.
- The National Library of Medicine (USA) : Hazardous Substances Data Bank (HSDB), ed. 2010.
- Environmental Protection Agency (USA) : Integrated Risk Information System (IRIS), ed. 2006.
- Department of Transportation (USA) : Chemical Hazard Response Information System (CHRIS), ed. 2006.
- CRC Press (USA) : Handbook of Chemistry and Physics, 77<sup>th</sup> ed., 1997.
- Institut National de Recherche et de Sécurité (INRS - F) : Les Melanges Explosifs, ed. 1994.
- NIOSH Pocket Guide to Chemical Hazards & Other Databases. U.S. Department of Health & Human Services, Public Health Service, Center for Disease Control & Prevention. DHHS (NIOSH) Publication No. 2001-145 (CD-ROM) August 2001.]
- Daubert, T.E., R.P. Danner. Physical and Thermodynamic Properties of Pure Chemicals Data Compilation. Washington, D.C.: Taylor and Francis, 1989.
- O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1397

**Indications on training** : personnel charged with handling and use of the product must be trained and informed on the specific risks and on all safety measures

**Written references** : refer to the technical instructions shown on product.

**Technical Assistance Contact Centre** : Tel. +39.011.8005013

**NOTE** : Information contained herein is based on our current knowledge regarding health, safety and environment issues; this information is intended to help professional users of the product locate preventive and protective behavioural actions in order to operate safely.

Before using the product for a purpose different to that intended, the user of the product must check whether other, additional information is needed and must always observe law rules and good operating practice.

We assume no liability for any damage or injury of any kind which may arise out of any improper use of the product.

Characteristics mentioned herein are not to be considered as a guarantee of specific properties of the product.

The product label or product MSDS is to be always shown when seeking medical attention.

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