MATERIAL SAFETY DATA SHEET (MSDS)
CLASS 2.1 – FLAMMABLE GASES

1. CHEMICAL PRODUCT IDENTIFICATION

1.1 PRODUCT IDENTIFIER:

This data sheet is about substances and mixtures that are characterized as flammable gases which are included in Class 2.1, according UNITED NATIONS Committee of Experts on the Transport of Dangerous Goods (UN). A gas is a substance which:

- At 50 °C has a vapour pressure greater than 300 kPa. Or
- Is completely gaseous at 20 °C at a standard pressure of 101.3 kPa.

The class comprises compressed gases, liquefied gases, dissolved gases, refrigerated liquefied gases, mixtures of one or more gases with one or more vapours of substances of other classes, articles charged with a gas and aerosols.
A flammable gas (Class 2.1) means a gas which at 20 °C and a standard pressure of 101.3 kPa:

- is ignitable when in a mixture of 13 per cent or less by volume with air. Or
- has a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability shall be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used;

The following products have been recorded in the present MSDS: Propane, LPG Mixture

1.2 RELEVANT IDENTIFIED USES:

- Worker: Manufacture, distribution, formulation and repacking, use as a fuel, in the petroleum industry. **- Professional:** Use as a fuel. - **Consumer:** Use as a fuel

Emergency telephone number:

National Emergency Centre: 166
National Poison Centre: (+30) 2107793777

2. HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF HAZARDS:

2.1.1 According to GHS (EC Regulation 1272/2008)


GHS02

- Flammable Gas (Flam. Gas): H220
***H220*:** Extremely flammable gas


GHS04

- Gas under pressure (Press. Gas): H280
***H280*:** Contains gas cylinder under pressure; may explode if heated


GHS08

- Mutagenicity (Muta.): H340
H340: *May cause genetic defects*
- Carcinogenicity (Carc.): H350
H350: *May cause cancer*

2.1.2 According to DSD-DPD (Directive 67/548/EEC)

- Flammable (F): R12
R12: *extremely flammable*

- Toxic (T): R20, R23

R20: *harmful by inhalation*
R23: *Toxic if inhaled*
- Carcinogenic (Carc. Cat.): R45
R45: *may cause cancer*
- Mutagenic (Muta. Cat.): R46
R46: *may cause heritable genetic damage*
- Toxic for reproduction (Repr. Cat.): R61
R61: *may cause harm to the unborn child*

2.2 LABELLING:

1. According to GHS (EC Regulation 1272/2008)

Signal word: **D a n g e r**

Hazard pictograms (at least a subset): GHS02, GHS04, GHS08

Hazard statements (H) (at least a subset): H220, H280, H340. H350 (*For full text of H-statements: see SECTION 2.1*)

Precautionary statements (P) (at least a subset):
P102: (Only if sold to the general public): Keep out of reach of children.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/.../hot surfaces. ... No smoking.
P281: Use personal protective equipment as required.
P410+P403: Protect from sunlight. Store in a well-ventilated place.
P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely**.**
P381: Eliminate all ignition sources if safe to do so.
P308+P313: If exposed or concerned: Get medical advice/attention

Supplemental Hazard Information (EU) may be:
Not available

2. According to DSD-DPD (Directive 67/548/EEC)

Symbol(s) and indication(s) of danger (at least a subset):

F	Flammable
T	Toxic

Risk Phrases (R) (at least a subset): R12. R20, R23. R45. R46. R61 (*For full text of R-phrases: see SECTION 2.1*)

Safety phrases (S) (at least a subset):
S2: (If only sold to the general public): keep out of the reach of children
S9: Keep container in a well-ventilated place.
S16: Away from sources of ignition - No smoking.
S33: Take precautionary measures against static discharges.
S45: in case of accident or if you feel unwell, seek medical advice immediately
S53: avoid exposure - obtain special instructions before use
S63: In case of accident y inhalation: remove casualty to fresh air and keep at rest.

Particular hazards to man and environment:
Not available

2.3 OTHER HAZARDS:
PBT and vPvB assessment: PBT: The substance does not fulfill the criteria for being persistent, bioaccumulative and toxic. **vPvB:** The substance does not fulfill the criteria for being very persistent and very bioaccumulative.

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 MIXTURE:
Composition is referred to ANNEX-ADDITIONAL INFORMATION.xlsx
Hazardous ingredients (at least a subset): Gasoline Low boiling point naphtha-unspecified, MTBE (or Tert-butyl methylether or 2-methoxy-2- methylpropane), TAME, Kerosene (petroleum), sweetened, Kerosene-unspecified, 2-(2-methoxyethoxy)ethanol, Sodium, Naphthalene, (1,2,4)Trimethylbenzene, (1,3,5)Trimethylbenzene, Polycyclic Aromatic

Hydrocarbons (mainly 3-7 rings), N-Ethyl-N-[2-[1-(2-methylpropoxy)ethoxy]ethyl]-4-phenyldiazenylaniline, Biodiesel (FAME: fatty acid methyl ester, Fatty acid: C10-18 and C12-22-unsaturated., C14-18 and C16-18-unsaturated. alkyl esters (FAAE)

4. FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES:

WARNING BEFORE PREVENTION: Before attempting to rescue casualties, isolate area from all potential sources of ignition including disconnecting electrical supply**.** Ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry into confined spaces. Take care to self-protect by avoiding becoming contaminated - use approved positive pressure air supplied breathing apparatus with a full face piece. Rescuers should employ the adequate personal protective equipment. Move contaminated patient(s) out of the dangerous area. Seek medical assistance - show the material safety data sheet or label if possible. (Subject to applicability: H_2S and/or CO content may cause specific hazard conditions).

FOLLOWING INHALATION: Remove casualty to a quiet, cool and well ventilated place. Do not leave the victim unattended.
A. If the casualty is conscious: Place the casualty in recovery position with legs slightly raised. Loose tight clothing, cover with a blanket. Keep patient warm and at rest. Obtain medical advice.
B. If the victim is unconscious or conscious but breathes with difficulty: Seek medical advice immediately. Place the casualty in the recovery position with legs slightly raised. Loose tight clothing and cover with a blanket. Supply oxygen. If necessary, give external cardiac massage.
C. If the casualty does not breathe: Give artificial Respiration. Obtain medical advice immediately. Place the casualty in the recovery position with legs slightly raised. Loose tight clothing and cover with a blanket. When the respiration recurs, provide oxygen. If necessary, give external cardiac massage.
(Subject to applicability): If there is any suspicion of inhalation of H_2S or CO, rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures. Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Obtain medical advice for further treatment.

FOLLOWING SKIN CONTACT: Remove the casualty from the area of the incident. - Do not remove clothing that adheres due to freezing. Wash thoroughly the affected skin area with soap and copious amount of water - continue for at least 15 minutes. If this is not possible, wrap the affected area with a clean blanket. If the skin is simply dry, apply carefully lanolin ointment. In case of cold burn, obtain medical advice immediately. Cover the wound only with sterilized materials. In case of frostbite, the tissues acquire a greyish-yellow color with waxy texture and when they unfreeze they locally swell and are susceptible to infections. Place the affected fingers or hands under the armpit and obtain medical advice immediately. Supply the casualty with a hot (non-alcoholic) beverage. Cover the wound only with sterilized materials. If there are signs of frostbite, (blanching or redness of skin or burning or tingling sensation), do not rub, massage or compress the affected area. Send the casualty immediately to hospital.

FOLLOWING EYE CONTACT: Remove the casualty from the area of the incident. Wash eyes with copious amount of water for at least 15 min keeping the eyelids open. Remove any contact lenses. Do not administer eye drops or other liquid without medical approval. Obtain medical advice. Keep eye wide open while rinsing. If there are signs of frostbite, pain, swelling, lachrimation or photophobia persists, the patient should be seen in a specialist health care facility.

FOLLOWING INGESTION: Not considered a likely route of exposure - frostbite to the lips and mouth may occur if in contact with the liquid.

NOTES FOR THE DOCTOR: A simple asphyxiant gas at normal temperatures and pressures - there is no specific antidote. In the event of contact with product in (liquid form treat for frostbite. (Subject to applicability: In case of effects from inhalation of H2S or CO, follow the specific protocols.)

4.2 MOST IMPORTANT SYMPTOMS AND EFFECT, BOTH ACUTE AND DELAYED:

Inhalation: Exposure to high concentrations may cause asphyxiation. **Skin contact:** Contact with product in liquid form may cause frostbite. **Eye contact:** Contact with product in liquid form may cause frostbite. **Ingestion:** Not considered a likely route of exposure.

4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED:

Not mentioned

5. FIRE-FIGHTING MEASURES

5.1 EXTINGUISHING MEDIA:

Where possible stop the flow of gas, and if safe to do so. If the flow cannot be stopped allow the fire to burn out, whilst cooling containers and surroundings with a water spray. Immediate interruption of the feeding of the fire with the product. The emergency exits must be left free. Large extent fires are handled by specially trained personnel.

Suitable extinguishing media: Large scale fires are handled by specially trained personnel, using water spray, water fog or foam. Use of water to cool the external surface of the fire-exposed containers or tanks. Small scale fires are handled using dry powder or carbon dioxide (CO2) extinguisher, dry sand or fire fighting foam.
Unsuitable extinguishing media: Do NOT use water jet. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE:
Specific hazards arising from the chemical: Insufficient cooling of the tank results in the abrupt increase of the pressure due to vaporization of its content and increase of the temperature of the shell, leading to the full rupture of the tank and the instantaneous expansion of its content. Ignition and explosion of the expanded mass follows (BLEVE phenomenon).
Hazardous combustion products: Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

5.3 ADVICE FOR FIRE-FIGHTERS:
Level of protection advised: In case of a large fire or in confined or poorly ventilated spaces wear full fire persistent protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode in addition to standard fire fighting gear.
Specific fire-fighting methods: Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case or rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles. if this impossible, withdraw from area and let fire burn.

6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTION, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:
6.1.1 For non-emergency personnel: - Use of suitable protective clothing and breathing apparatus during handling of the released quantity (see Personal protective equipment, section 8). - Eliminate possible causes of ignition. - Stop all work that requires an open flame, stop all vehicles, and stop all machines and equipment that may cause sparks or flames. - All equipment used when handling the product must be grounded. - Prevent entry into waterways, sewers, basements or confined areas. - Stop leak if safe to do so. Avoid direct contact with released material and breathing vapours. Stay upwind. - Keep non-involved personnel away from the area of spillage. Alert emergency personnel. - Enter area only if strictly necessary. A combustible gas detector can be used to check for flammable gas or vapours. - Eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares, etc.). - If required, notify relevant authorities according to applicable regulations.
6.1.2 For emergency responders: - Spillages of material generate large volumes of extremely flammable gas which is heavier than air and will accumulate in low areas or confined spaces. (Subject to applicability): When the presence of dangerous amounts of H2S and/ or CO around the spilled product is suspected or proved, additional or special actions may be warranted, including access restrictions, use of special protection equipment, procedures and personnel training. - Vapour is denser than air - flashback may be possible over considerable distances. Cylinder or other containment vessels may explode under fire conditions - use water spray to cool unopened containers. Do not allow run-off from fire fighting to enter drains or water courses - may cause explosion hazard in drains and may reignite.

6.2 ENVIRONMENTAL PRECAUTIONS AND METHODS FOR CONTAINMENT AND CLEANING UP:
- Isolate spill. - Contain spillage - ventilate area and allow liquid to evaporate.
Land spillage: - Prevent further leakage or spillage if safe to do so. - Prevent spillage from entering drains or any place where accumulation may occur. - Ensure adequate ventilation, especially in confined areas.
Spillages in water or at sea: - In case of leakage of liquid propane into the sea, alert the coast guard as well as all the nearest ports regarding the event. Furthermore, the nearest ships should be informed so as to stay away from the leakage point. - Prevent further leakage or spillage if safe to do so. - Spillages of liquid product in the water will likely result in a quick and complete vaporization of the product. Isolate the area and prevent fire/ explosion hazard for ships and other structures, taking into account wind direction and speed, until the material is completely dispersed. - If the spillage contaminates rivers, lakes or drains inform respective authorities.

6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP
6.3.1 For containment: Isolate spill.
6.3.2 For cleaning up: Contain spillage - ventilate area and allow liquid to evaporate.
6.3.3 Other information: Refer to Section 13 for disposal of spilled material.

6.4 REFERENCE TO OTHER SECTIONS:
Refer to Sections 8 and 13.

7. HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING:

- Hazard for the formation of explosive mixture of vapors when mixed with air. The gas being heavier than air can travel long distances with the probability of ignition and return of the flame. - High temperature or flame, into the area where cylinders are placed, can cause their opening and explosion without activation of the safety valves. - High fire hazard. - Ensure that all regulations concerning explosive atmospheres and handling and storage facilities of flammable products are applied. - Minimize exposure using measures such as closed systems, dedicated facilities and suitable general/ local exhaust ventilation. - Cleaning, inspection and maintenance of the internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.
- (Subject to applicability): A specific assessment of inhalation risks from the presence of H2S and/ or CO in tank headspaces, confined spaces, product residue, tank waste and waste water and unintentional releases must be made to help determine controls appropriate to local circumstances. Consider the need for risk based health surveillance.

7.1.1 Protective measures:

Information on safe handling and measures to prevent fire/explosion: - Use only in well ventilated areas. - Consider technical advances and process upgrades (including automation) for the elimination of releases. - Drain down systems and clear transfer lines prior to breaking containment. - Clean/ flush equipment, where possible, prior to maintenance. - Ensure safe systems of work or equivalent arrangements are in place to manage risks. - Regularly inspect, test and maintain all control measures. - Avoid all sources of ignition, oxidizing agents, chlorine and hydrogen chloride or hydrogen fluoride. - Use piping and equipment designed to withstand the pressures to be encountered. - Use a check valve or other protective device to prevent reverse flow. - Handle empty containers with care. Vapour residue may be flammable. - Take precautionary measures against static discharges, use proper bonding and/ or grounding procedures. - In case those cylinders must be used for the local heating of interior areas, it is recommended to keep in these areas ONLY the cylinder in use. - The materials that should be used for the several operations must be carefully selected in order to be compatible with the product and to avoid their gradual destruction under the operating conditions. – (Ref. to *PROPANE*) Loading / Unloading Temperature: winter months, 20 – 25°C, summer months, 30 – 35°C. - Loading/ Unloading Pressure, kg/cm²: 14 - 15 (max)

Measures to protect the environment: - Spillages of liquid product will create a fire hazard and form an explosive atmosphere. Ensure all equipment is non-sparking or electrically bonded. Dispose of wastes safely.

7.1.2 Advice on general occupational hygiene: - Smoking, eating and drinking should be prohibited.

7.2 CONDITIONS FOR SAFE STORAGE:

Technical measures and storage conditions: - Store only in supplied cylinder or approved vessels. - Cylinders should be secured vertical - and only transported in a secure position in a well ventilated vehicle or hand truck. - Cylinders which have been are opened must be carefully released and kept upright. - For maintenance work or conservation, emptied tanks should be purged, and blanketed with inert gas (i.e. nitrogen). - The cylinders must be stored away from compressed oxygen cylinders. - Grounding of the tanks as well as their precautionary inspection is necessary. - Proper labelling of the propane storage tanks and their maintenance away from any source of ignition is necessary.

Packaging materials: - The suitable must be stored in specially designed pressurized containers (spherical containers, cylindrical containers, bottles) according to relevant regulations.

Requirements for storage rooms and vessels: - The propane tanks must be stored in outdoor areas or very well ventilated storage areas. - The areas where large quantities are stored must be equipped with automatic fire-fighting systems and emergency plans according to the relevant legislation.

Storage class: 2A

7.3. SPECIFIC END USE(S):

Refer to the Exposure Scenarios attached to current Safety Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. CONTROL PARAMETERS:

8.1.1 Occupational Exposure/Biological Limit Values: Occupational Exposure/Biological Limit Values are referred to ANNEX-ADDITIONAL INFORMATION.xlsx

8.1.2 Information on currently recommended monitoring procedures: European Standards EN 689, EN 1127:2007, EN 60079-0:2009

8.1.3 Applicable occupational exposure limit values and/or biological limit values for air contaminants (if formed when using the substance/mixture as intended): Applicable occupational exposure limit values and/or biological limit values for air contaminants are referred to ANNEX-ADDITIONAL INFORMATION.xlsx

8.1.4 DNEL / PNEC values: DNEC/PNEC values are referred to ANNEX-ADDITIONAL INFORMATION.xlsx

8.2 EXPOSURE CONTROLS:

- Avoid inappropriate handling that may lead to inhalation of propane vapours or contact with the liquid. - Occupational exposure: In case of product leakage during production, distribution, shipment, as well as during its filling and transport, there is a possibility of cold droplets splashing and generation of cold burn. Measurements should be conducted for the quantitative determination of the occupational exposure and the hazard assessment, according to the article 4 of the ΠΔ 338/2001. The

exposure can be minimized with the application of suitable control measures (establishment of procedures, ventilation, personal protective equipment). - Consumer exposure: In case of product release during its use or handling of the cylinders. It is necessary, to ensure adequate ventilation and avoidance of mishandling.

8.2.1 Appropriate engineering controls / Technical measures to prevent exposure:

Appropriate engineering controls: - Cleaning, inspection and maintenance of propane storage tanks require specific procedures and precautions (for the avoidance of suffocation hazards and exposure to hazardous concentrations of propane), such as the issue of work permits, draining product from the tanks, use of safety belts and personal breathing apparatus. - Natural or mechanical ventilation is required in order to ensure that the concentration of propane in air does not exceed the minimum limit of explosiveness (1.86% v/v). Installation of systems detecting flammable gases is recommended. - Use this product in a well ventilated atmosphere with explosion-proof equipment. - Entrance in confined areas is prohibited, when available oxygen concentration is < 20% v/v.

Organisational measures to prevent exposure: - The design of working methods and organizational measures must comply with Article 5 of ΠΔ 338/2001. - Before a worker is placed in a job with a potential for exposure to the substance, a licensed health care professional should evaluate and document the worker's baseline health status. - The observance to the regulations of personal hygiene and the supervision of health according to article 10 of ΠΔ 338/2001 is necessary.

8.2.2 Personal protection equipment:

Respiratory protection:

Wear a self-contained breathing apparatus (self-contained open circuit compressed air BA). Use of full face masks with hydrocarbon filters in case of small leakages. Use of personal breathing apparatus, in case of large leakages.

- CSN EN 136 - Respiratory protective devices - Full face masks - Requirements, testing, marking. - DIN EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking. BS EN 141:2000 - Respiratory protective devices. Gas filters and combined filters. Requirements, testing, marking

Eye protection:

Use of goggles or face shields is necessary for the protection of the eyes. During filling of cylinders or in case of contact with the liquid product, the use of impermeable gloves, of suitable protective clothing, goggles or face shields is necessary. During cylinder filling, the use of earplugs is recommended.

- CSN EN 166 - Personal eye-protection – Specifications. - CR13464 - Guide to selection, use and maintenance of occupational eye and face protectors.

Hand protection:

Wear impenetrable gloves. During filling of cylinders or in case of contact with the liquid product, the use of impermeable gloves, of suitable protective clothing, goggles or face shields is necessary.

- EN 60903:2003 Live working - Gloves of insulating material. - DIN EN 388 Protective gloves against mechanical risks. - DIN EN 420 Protective gloves - General requirements and test methods (includes Amendment A1:2009). The glove material has to be impermeable and persistent to the product / the substance / the preparation. Choose the glove material taking into consideration the penetration times, rates of diffusion and the degradation.

Material of gloves: The selection of suitable gloves does not only depend on the material, but also the additional quality characteristics and varies from manufacturer to manufacturer. Wear impenetrable gloves made of PVC or nitrile.

Penetration time of glove material: The exact penetration time is determined from the protective glove manufacturer and must be always followed.

Skin and body (including hands) protection:

Wear suitable protective clothing and protective boots. During filling of cylinders or in case of contact with the liquid product, the use of impermeable gloves, of suitable protective clothing, goggles or face shields is necessary. Use of safety shoes during handling of propane cylinders. In case of large extent fire, use of fire-persistent uniforms and self-contained breathing equipment is required.

- CSN EN 340 Protective clothing - General requirements. - BS EN 465:1995 - Protective clothing. Protection against liquid chemicals. Performance requirements for chemical protective clothing with spray-tight connections between different parts of the clothing (type 4 equipment). - BS EN 466-1:1995 - Protective clothing. Protection against liquid chemicals. Performance requirements for chemical protective clothing with liquid-tight connections between different parts of the clothing (type 3 equipment). - BS EN 467:1995 - Protective clothing. Protection against liquid chemicals. Performance requirements for garments providing protection to parts of the body.

In case of large extent fire: - BS EN 533:1997 Protective clothing. Protection against heat and flame. Limited flame spread materials and material assemblies. - DIN EN 137 - Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking. - EN 469 - Protective clothing for fire fighting. - BS EN

1486:2007 - Protective clothing for fire fighters. Test methods and requirements for reflective clothing for specialized fire-fighting.
8.2.3 Environmental exposure controls: - Probability for leakage to the environment (in the air) during production and distribution. Monitoring of losses to the environment to be conducted according to local and EU regulations. - Given the high vapor pressure of propane, the main route of its possible release to the environment is air during its production and transport. - Losses to the environment are controlled through the directives 96/61/EEC, 96/62/EEC and 2001/81/EEC.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES:
Physical and chemical properties are referred to ANNEX-ADDITIONAL INFORMATION.xlsx

10. STABILITY AND REACTIVITY

10.1 REACTIVITY:
- Not available data

10.2 CHEMICAL STABILITY:
(May be) The product is stable at normal storage, handling and use temperatures.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS:
- Not available data

10.4 CONDITIONS TO AVOID:
(May be) - Contact with incompatible materials, expose in flame, sparks and other sources of ignition.

10.5 INCOMPATIBLE MATERIALS:
(May be) Halogens, Oxidizing agents.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS:
(May be) Carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS:
Toxicological information is referred to ANNEX-ADDITIONAL INFORMATION.xlsx
Acute toxicity: - The substance is not considered as toxic. It is characterised as a simple asphyxiant. - The substance is a flammable gas at room temperature and therefore the requirement for data on acute oral and dermal toxicity is waived in accordance with REACH Annex XI.
Skin corrosion/irritation: - In case of skin contact, rapid vaporization of the substance induces a cold burn. - The substance is a flammable gas at room temperature. Therefore, in accordance with section 2 of REACH Annex XI, skin irritation studies cannot be conducted. There are no indications that main constituents of the substance are skin irritants, but direct skin or mucous membrane contact with liquid forms of alkane gases may cause burns and frostbite due to the extreme cold of the liquid.
Serious eye damage /irritation: - In case of eye contact, rapid vaporization of propane induces irritation, dazzling and pain. - The substance is a flammable gas at room temperature. Therefore, in accordance with section 2 of REACH Annex XI, eye irritation studies cannot be conducted. There are no indications that main constituents of the substance are eye irritants.
Respiratory or skin sensitisation: - Substance's vapours do not irritate the respiratory system. - Short exposure to low concentrations is not harmful. - Vapour inhalation in concentrations higher than 10% v/v induces narcotic activity combined with headache, nausea, weakness, dazzling and somnolence. - Exposure to very high concentrations induces spasms and loss of consciousness. – Substance's vapors, being heavier than air, tend to displace the air, decreasing the concentration of the existing available oxygen for breathing, with the hazard of suffocation in cases of large extent leakages. - There are no data on skin sensitisation and no indications that the substance or its main components are skin sensitisers. All are flammable gases at room temperature and therefore studies on skin sensitisation are waived. No studies on respiratory sensitisation have been conducted but there are no indications that the substance or its main components are respiratory sensitisers.
Germ cell mutagenicity: - A genetic hereditary defect is possible to be caused. - No available data. Mutagenicity data exist for the main components of the substance. A review of an extensive database indicates that the substance and its main components are not genotoxic.
Carcinogenicity: - Presence of 1,3-butadiene in concentration higher than 0,1% w/w is considered as carcinogenic. - No specific carcinogenicity data are available.
Toxicity to reproduction: - No available data. The weight of evidence from studies on a similar stream, main components C2-C4 alkanes and propene indicates no evidence or reproductive toxicity.

STOT - single exposure: - No available data.
STOT - repeated exposure: - No available data.
Aspiration hazard: - No available data.

12. ECOLOGICAL INFORMATION

Ecological information is referred to ANNEX-ADDITIONAL INFORMATION.xlsx

12.1 TOXICITY:
- The product released in the environment is rapidly dispersed in air, where it is subjected to a photochemical decomposition, reacting with hydroxyl radicals, having a half-life time. - It is not regarded as affecting the depletion of the ozone layer of the atmosphere.
12.1.1 Aquatic toxicity: - Due to high volatility, it does not pollute the aquatic receivers. - Apart from short-term toxicity, no needs to investigate further the effects on aquatic organisms, according to the Chemical Safety Assessment. - It has no nocuous effects to aquatic fauna. - The activated sludge respiration inhibition test does not need to be conducted as there are mitigating factors indicating that microbial toxicity is unlikely to occur as the substance is a gas at ambient temperature and pressure and expected to partition to air.
12.1.2 Sediment toxicity: - The long term toxicity to sediment organisms study does not need to be conducted according to the Chemical Safety Assessment.
12.1.3 Terrestrial Toxicity: - Due to its high volatility, it does not pollute the soil receivers. – The short term toxicity to invertebrates study does not need to be conducted as direct and indirect exposure of the soil compartment is unlikely. – It has no nocuous effects to terrestrial fauna. **Toxicity to birds:** - According to the Chemical Safety Assessment, the long term or reproductive toxicity to birds study does not need to be conducted as there is no indication that this substance has the potential to contaminate food chains as it is not persistent or bioaccumulative.

12.2 PERSISTENCE AND DEGRADABILITY:
12.2.1 Persistence Assessment: Predicted data indicate that representative structures of the substances are not considered to be persistent and do not meet the screening criteria for persistence.
12.2.2 Stability: ***Hydrolysis*****:** The substance is not expected to undergo hydrolysis in the environment due to lack of hydrolysable functional groups and therefore testing does not appear scientifically necessary. ***Phototransformation in air*****:** No available data. ***Phototransformation in water and soil*****:** No available data.
12.2.3 Biodegradation: ***Biodegradation in water*****:** - In the absence of experimental data the potential biodegradation rates of representative members of the category were estimated using QSAR calculations. These estimates predict that the members of the category are readily biodegradable. ***Biodegradation in water and sediment*****:** - The substance has a low potential for adsorption to sediment. Simulation testing does not need to be conducted as the Chemical Safety Assessment has not indicated a need to investigate further the degradation of the substance in water. ***Biodegradation in soil*****:** - The study does not need to be conducted as the substance has a low potential for adsorption to soil.

12.3 BIOACCUMULATIVE POTENTIAL:
- The substance does not meet the Bioacculative (B) or very Bioaccumulative (vB) criteria. The substance is therefore not considered B or vB.

12.4 MOBILITY IN SOIL:
- No available data.

12.5 RESULTS OF PBT AND vPvB ASSESSMENT:
- The screening assessment of the available data for the substance indicates that the substance is not considered a PBT/vPvB.
- Emission Characterization is not required because the substance does not fulfill the PBT/vPvB criteria.

13. DISPOSAL CONSIDERATIONS

13.1 WASTE TREATMENT METHODS:
13.1.1 Product / Packaging disposal: Dispose accordingly to the relative Legislation and the approval of local authorities.
13.1.2 Waste treatment - relevant information: - The product evaporates very rapidly in normal conditions of temperature and pressure and the need of disposal is infrequent.
13.1.3 Sewage disposal - relevant information: It must not be disposed of to sewers.
13.1.4 Other disposal recommendations: - Return the partly used or empty cylinders to the supplier.
13.2 ADDITIONAL INFORMATION:
- Avoidance of uncontrolled combustion is recommended. - The redundant gases of the production process systems are led to the torch where they are combusted under a controlled rate. - Its ultimate use ends up to combustion (when used as fuel) or dispersion in atmosphere (when used as propulsion media).

14. TRANSPORT INFORMATION

Pictogram(s):

LAND TRANSPORT (Road/Rail) according to ADR/RID 2003, ΠΔ 104/99 and its amendments (ΦΕΚ 509Β/2000 and 1232Β/2001), Directives 94/55/EEC and 96/49/EEC and their amendments.

Transport Hazard Class(es): 2.1

Packing group: -

INLAND WATERWAY TRANSPORT (AND(R))

Transport Hazard Class(es): 2.1

MARINE TRANSPORT according to IMDG – IMO Code 2002 and ΠΔ 405/96

Transport Hazard Class(es): 2.1

Packing group: -

AIR TRANSPORT (ICAO-TI/IATA-DRG)

Transport Hazard Class(es): 2.1

Packing group: -

More details such as Environmental hazards (UN Model Regulations/2009), limited quantities, packaging and IBCs, portable tanks and bulk containers and special precautions for users about transport information are referred to ANNEX-ADDITIONAL INFORMATION.xlsx

15. REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE:

National Regulations: ΑΧΣ 47/ΦΕΚ 431Β/95, Υ.Α. 265/2002/2002 (ΦΕΚ 1214/Β/19.9.2002), Υ.Α. 195/2002/2002 (ΦΕΚ 907/Β/17.7.2002), Υ.Α. 378/94/1994 (ΦΕΚ 705/Β/20.9.1994), Decision 508/91/1991 (ΦΕΚ 886/Β/30.10.1991).

EU Regulations: REGULATION (EC) 1907/2006, REGULATION (EC) No 1272/2008

15.2 CHEMICAL SAFETY ASSESSMENT:

A Chemical Safety Assessment has been carried out.

16. OTHER INFORMATION

KEY LITERATURE REFERENCES AND SOURCE OF DATA:

UN Recommendations on the Transport of Dangerous Goods - Model Regulations Revised edition, 2011. IBC Code. IATA, DG list by Pl. OSHA, Occupational Safety & Health Administration.

RELEVANT R-PHRASES AND/OR H-STATEMENTS MAY BE:

R11: Extremely flammable
R20/22: Harmful by inhalation and if swallowed
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

H224: Extremely flammable liquid and vapours
H302: Harmful if swallowed
H332: Harmful if inhaled
H400: Very toxic to aquatic life
H410: Very toxic to aquatic life with long term lasting effects

TRAINING ADVICE: The information of the present generalized Material Safety Data Sheet can be used for training purpose.