

SAFETY DATA SHEET

Version 1.3
Revision Date 04.06.2015
Supersedes Version: 1.2

SDS Number 300000025810
Print Date 04.02.2016

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

1.1. Product identifier : Propane

Refer to Section 3 for REACH information

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

Use of the Substance/Mixture : General Industrial

Restrictions on Use : No data available.

1.3 Details of the supplier of the safety data sheet : Air Products Plc
2 Millennium Gate
Westmere Drive
Crewe
Cheshire

Email Address – Technical Information : GASTECH@airproducts.com

Telephone : +44(0)8457 020202

1.4. Emergency telephone number : 1. Cylinder 0500 020202 / +44 870 190 6874
2. Bulk 0500 020202 / +44 2030 240 571
3. Medical 0500 020202 / +44 1270 218 050

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Flammable gases - Category 1 H220:Extremely flammable gas.
Gases under pressure - Liquefied gas. H280:Contains gas under pressure; may explode if heated.

2.2. Label elements

Hazard pictograms/symbols



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Signal Word: Danger

Hazard Statements:

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

Precautionary Statements:

Prevention : P210:Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. 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 : P403:Store in a well-ventilated place.

2.3 Other Hazards

Can cause rapid suffocation.
Extremely flammable liquefied gas.
May form explosive mixtures in air.
Vapors may spread long distances and ignite.
Immediate fire and explosion hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).
High concentrations that can cause rapid suffocation are within the flammable range and should not be entered.
Avoid breathing gas.
Direct contact with liquid can cause frostbite.
Self contained breathing apparatus (SCBA) may be required.

SECTION 3: Composition/information on ingredients

Substance/Mixture : Substance

Components	EINECS / ELINCS Number	CAS Number	Concentration (Volume)
But-1-ene	203-449-2	106-98-9	< 1 %
Butane	203-448-7	106-97-8	< 2 %
Isobutane	200-857-2	75-28-5	< 2 %
Propene	204-062-1	115-07-1	< 7 %
Propane	200-827-9	74-98-6	> 87%

Components	Classification (CLP)	REACH Reg. #
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But-1-ene	Flam. gas 1 ;H220 Press. Gas (Liq.) ;H280	01-2119456615-3 4
Butane	Flam. gas 1 ;H220 Press. Gas (Liq.)	01-2119474691-3 2
Isobutane	Flam. gas 1 ;H220 Press. Gas (Liq.)	01-2119485395-2 7
Propene	Flam. gas 1 ;H220 Press. Gas (Liq.)	01-2119447103-5 0
Propane	Flam. gas 1 ;H220 Press. Gas (Liq.) ;H280	01-2119486944-2 1

If REACH registration numbers do not appear the substance is either exempt from registration, does not meet the minimum volume threshold for registration, or the registration date has not yet come due.

Refer to section 16 for full text of each relevant R-phrased and H-phrases.

Concentration is nominal. For the exact product composition, please refer to Air Products technical specifications.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Keep eye wide open while rinsing. Seek medical advice.
- Skin contact : Wash frost-bitten areas with plenty of water. Do not remove clothing. Cover wound with sterile dressing.
- Ingestion : Ingestion is not considered a potential route of exposure.
- Inhalation : Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. In case of shortness of breath, give oxygen.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : Exposure to oxygen deficient atmospheres may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

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SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media : All known extinguishing media can be used.

Extinguishing media which must not be used for safety reasons. : No data available.

5.2 Special hazards arising from the substance or mixture

: Gas is heavier than air and may collect in low areas or travel along the ground where there may be an ignition source present. If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken (e.g. total evacuation to protect persons from cylinder fragments and toxic fumes should a rupture occur). Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Combustion by-products may be toxic. Keep containers and surroundings cool with water spray. If possible, shut off the source of gas and allow the fire to burn itself out. Extinguish fire only if gas flow can be stopped. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Move away from container and cool with water from a protected position. Keep adjacent cylinders cool by spraying with large amounts of water until fire burns itself out.

5.3 Advice for fire-fighters

: In confined space use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

: Evacuate personnel to safe areas. Remove all sources of ignition. Never enter a confined space or other area where the flammable gas concentration is greater than 10% of its lower flammable limit. Ventilate the area.

6.2 Environmental precautions

: Should not be released into the environment. Do not discharge into any place where its accumulation could be dangerous. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up

: Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost). Ventilate the area. Approach suspected leak areas with caution.

Additional advice

: If possible, stop flow of product. If leak is from cylinder or cylinder valve, call the Air Products emergency telephone number. If the leak is in the user's system,

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close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs. Increase ventilation to the release area and monitor concentrations.

6.4 Reference to Other Sections : For more information refer to Sections 8 & 13

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shock. Never attempt to lift a cylinder by its valve protection cap or guard. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Do not smoke while handling product or cylinders. Never re-compress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. Purge air from system before introducing gas. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture. Ensure equipment is adequately earthed.

7.2 Conditions for safe storage, including any incompatibilities

Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Full containers should be stored so that oldest stock is used first. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep

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containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Smoking should be prohibited within storage areas or while handling product or containers. Display "No Smoking or Open Flames" signs in the storage areas. The amounts of flammable or toxic gases in storage should be kept to a minimum. Return empty containers in a timely manner.

Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations. Keep away from combustible material. All electrical equipment in the storage areas should be compatible with flammable materials stored. Containers containing flammable gases should be stored away from other combustible materials. Where necessary containers containing oxygen and oxidants should be separated from flammable gases by a fire resistant partition.

7.3 Specific end use(s)

Refer to section 1 or the extended SDS if applicable

SECTION 8: Exposure controls / personal protection

8.1 Control parameters

Exposure limit(s)

Butane	Time Weighted Average (TWA): EH40 WEL	600 ppm	1,450 mg/m3
Butane	Short Term Exposure Limit (STEL): EH40 WEL	750 ppm	1,810 mg/m3

If applicable, refer to the extended section of the SDS for further information on CSA.

8.2 Exposure controls

Engineering measures

Provide natural or explosion-proof ventilation that is adequate to ensure flammable gas does not reach its lower explosive limit.

Personal protective equipment

- Respiratory protection : High concentrations that can cause rapid suffocation are within the flammable range and should not be entered.
- Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
- Eye/face Protection : Safety glasses recommended when handling cylinders.
Standard EN 166 - Personal eye-protection.
- Skin and body protection : Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
Safety shoes are recommended when handling cylinders.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Special instructions for : Ensure adequate ventilation, especially in confined areas.

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protection and hygiene

Environmental Exposure Controls : If applicable, refer to the extended section of the SDS for further information on CSA.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- (a/b) Physical state/Colour : Liquefied gas. Colorless gas
- (c) Odour : Sweet. Poor warning properties at low concentrations. Stenchant often added.
- (e) Relative Density : No data available.
- (f) Melting point / freezing point : No data available.
- (g) Boiling point/range : -44 °F (-42 °C)
- (h) Vapor pressure : 141.69 psia (9.77 bara) at 70 °F (21 °C)
- (i) Water solubility : No data available.
- (j) Partition coefficient (n-octanol/water) : Not applicable.
- (k) pH : Not applicable.
- (l) Viscosity : Not applicable.
- (m) Particle characteristics : No data available.
- (n) Lower and upper explosion / flammability limits : 9.6 %(V) / 2.1 %(V)
- (o) Flash point : Not applicable.
- (p) Autoignition temperature : No data available.
- (q) Decomposition temperature : No data available.

9.2. Other information

- Explosive properties : No data available.
- Oxidizing properties : No data available.
- Odor threshold : No data available.
- Evaporation rate : Not applicable.
- Flammability (solid, gas) : Refer to product classification in Section 2

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Upper flammability limit : 9.6 %(V)
Lower flammability limit : 2.1 %(V)
Relative vapor density : No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity : Refer to possibility of hazardous reactions and/or incompatible materials sections.
10.2. Chemical stability : Stable under normal conditions.
10.3. Possibility of hazardous reactions : May occur at high temperatures or in the presence of a catalyst.
10.4. Conditions to avoid : Heat, flames and sparks.
10.5. Incompatible materials : Oxygen.
Oxidizing agents.
10.6 Hazardous decomposition products : Incomplete combustion may form carbon monoxide.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Likely routes of exposure

Effects on Eye : Contact with liquid may cause cold burns/frostbite.
Effects on Skin : Contact with liquid may cause cold burns/frostbite.
Inhalation Effects : May cause anesthetic effects. Propylene is a Central Nervous System (CNS) depressant and a mild anesthetic. Inhalation may cause central nervous system effects. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.
Ingestion Effects : Ingestion is not considered a potential route of exposure.
Symptoms : Exposure to oxygen deficient atmospheres may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

Acute toxicity

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Acute Oral Toxicity : No data is available on the product itself.
Acute Inhalation Toxicity : No data is available on the product itself.
Acute Dermal Toxicity : No data is available on the product itself.
Skin corrosion/irritation : No data available.
Serious eye damage/eye irritation : No data available.
Sensitization. : No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity : No data available.
Reproductive toxicity : No data is available on the product itself.
Germ cell mutagenicity : No data is available on the product itself.
Specific target organ systemic toxicity (single exposure) : No data available.
Specific target organ systemic toxicity (repeated exposure) : No data available.
Aspiration hazard : No data available.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity : No data is available on the product itself.
Toxicity to other organisms : No data is available on the product itself.

12.2. Persistence and degradability

No data available.

12.3. Bioaccumulative potential

No data is available on the product itself.

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12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

If applicable, refer to the extended section of the SDS for further information on CSA.

12.6 Other adverse effects

No data available.

Effect on the ozone layer

Ozone Depleting : No data available.
Potential

Global Warming Potential : No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods : Contact supplier if guidance is required. Return unused product in original cylinder to supplier. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Refer to the EIGA code of practice Doc. 30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods. List of hazardous waste codes: 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

Contaminated packaging : Return cylinder to supplier.

SECTION 14: Transport information

ADR

UN/ID No. : UN1965
Proper shipping name : HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (Propane, Propylene)
Class or Division : 2
Tunnel Code : (B/D)
Label(s) : 2.1
ADR/RID Hazard ID no. : 23
Marine Pollutant : No

IATA

UN/ID No. : UN1965
Proper shipping name : Hydrocarbon gas mixture, liquefied, n.o.s., (Propane, Propylene)
Class or Division : 2.1
Label(s) : 2.1

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Marine Pollutant : No

IMDG

UN/ID No. : UN1965
Proper shipping name : HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (Propane, Propylene)
Class or Division : 2.1
Label(s) : 2.1
Marine Pollutant : No

RID

UN/ID No. : UN1965
Proper shipping name : HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (Propane, Propylene)
Class or Division : 2
Label(s) : 2.1
Marine Pollutant : No

Further Information

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact an Air Products customer service representative.

SECTION 15: Regulatory information

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

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on Inventory.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

15.2 Chemical safety assessment

If this product does not contain exposure scenarios, the components in this product are either exempt from REACH, do not meet the minimum volume threshold for a CSA, or the CSA has not yet been completed.

SECTION 16: Other information

Ensure all national/local regulations are observed.

Hazard Statements:
H220 Extremely flammable gas.

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H280 Contains gas under pressure; may explode if heated.

Indication of Method:

Flammable gases Category 1 Extremely flammable gas. Calculation method

Gases under pressure Liquefied gas. Contains gas under pressure; may explode if heated. Calculation method

Abbreviations and acronyms:

ATE - Acute Toxicity Estimate
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
EINECS - European Inventory of Existing Commercial Chemical Substances
ELINCS - European List of Notified Chemical Substances
CAS# - Chemical Abstract Service number
PPE - Personal Protection Equipment
Kow - octanol-water partition coefficient
DNEL - Derived No Effect Level
LC50 - Lethal Concentration to 50 % of a test population
LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose)
NOEC - No Observed Effect Concentration
PNEC - Predicted No Effect Concentration
RMM - Risk Management Measure
OEL - Occupational Exposure Limit
PBT - Persistent, Bioaccumulative and Toxic
vPvB - Very Persistent and Very Bioaccumulative
STOT - Specific Target Organ Toxicity
CSA - Chemical Safety Assessment
EN - European Standard
UN - United Nations
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
IATA - International Air Transport Association
IMDG - International Maritime Dangerous Goods
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
WGK - Water Hazard Class

Key literature references and sources for data:

ECHA - Guidance on the compilation of safety data sheets
ECHA - Guidance on the application of the CLP Criteria
ARIEL database

Prepared by : Air Products and Chemicals, Inc. Global EH&S Product Safety Department

For additional information, please visit our Product Stewardship web site at
<http://www.airproducts.com/productstewardship/>

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws. Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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