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

1.1. Product identifier

Trade name	Mixture 10-19% ethylene oxide / 81-90% carbon dioxide
Chemical description	10-19% ethylene oxide / 81-90% carbon dioxide
CAS N°	-
CE N°	-
Index N°	-
Registration n°	-
Chemical formula	C ₂ H ₄ O, CO ₂

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

Relevant identified uses	Industrial and professional Test gas/Calibration gas Chemical reaction / Synthesis Laboratory use Contact supplier for more information on use
Uses advised against	Consumer use not recommended

1.3. Details of the supplier of the safety data sheet

Company identification	MULTIGAS Route de l'Industrie 102 CH-1564 Domdidier
Phone number	+41 (0) 26 676 94 94
E-mail address	info@multigas.ch

1.4. Emergency telephone numbers


145 (Toxicology Centre Zurich) or +41 (0) 44 251 51 51
 +41 (0) 26 676 94 94 (Multigas)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flammable gases, Category 1	H220
Chemically unstable gases, Category A	H230

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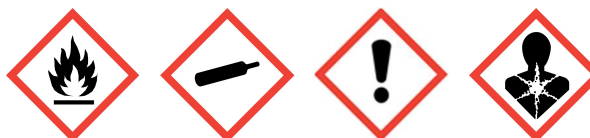
Gases under pressure : Liquefied gas	H280
Acute toxicity (ingestion: gas) Category 4	H302
Skin corrosion/irritation, Category 2	H315
Serious eye damage/eye irritation, Category 2	H319
Acute toxicity (inhalation: gas) Category 3	H331
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335
Germ cell mutagenicity, Category 1B	H340
Carcinogenicity, Category 1B	H350i
May affect fertility. May harm the foetus. Category 1B	H360Fd
Specific target organ toxicity — Repeated exposure, Category 1	H372

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

2.2. Label elements

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

Hazard pictograms



GHS02

GHS04

GHS07

GHS08

Signal word

Danger

Hazard statements

H220	Extremely flammable gas
H230	May react explosively even in the absence of air
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation
H331	Toxic if inhaled
H335	May cause respiratory irritation
H340	May cause genetic defects
H350	May cause cancer
H372	Causes damage to organs through prolonged or repeated exposure

Precautionary statements

P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

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P260	Do not breathe gas, vapours
P280	Wear protective gloves, protective clothing, eye protection, face protection
P302+P352	IF ON SKIN: Wash with plenty of water
P304+P340+P315	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention
P305+P351+P338+P315	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention
P308+P313	IF exposed or concerned: Get medical advice
P332+P313	If skin irritation occurs: Get medical advice/attention
P405	Store locked up
P410+P403	Protect from sunlight. Store in a well-ventilated place

2.3. Other hazards

None

SECTION 3: Composition/information on ingredients

3.1. Substances


Name	Product identifier	Concentration	Classification
Carbon dioxide	(CAS-No) 124-38-9 (CE-No) 204-696-9 (EC Index-No) --- (Registration-No.) --	≥ 81% - ≤90%	Press. Gas (Liq.), H280
Ethylene oxide	(CAS-No.) 75-21-8 (EC-No.) 200-849-9 (EC Index-No.) 603-023-00-X (Registration-No.) 01-2119432402-53	≥10% - ≤19%	Flam. Gas 1, H220 Chem. Unst. Gas A, H230 Press. Gas (Liq.), H280 Acute Tox. 3 (Inhalation: gas), H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1B, H350 STOT SE 3, H335 STOT RE 1, H372

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

Contains no other components or impurities which will influence the classification of the product

3.2. Mixtures

Not established

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SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	See a doctor. Show this safety data sheet to the attending physician
In case of inhalation	In case of inhalation, remove the person from the contaminated area. In case of respiratory arrest, give artificial respiration. See a doctor
In case of skin contact	Wash with soap and plenty of water. See a doctor
In case of eyes contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a doctor
In case of ingestion	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. See a doctor

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

May cause irritation to cornea (with temporary disturbance to vision)
 May cause irritation to skin
 May cause irritation to the respiratory tract, sneezing, coughing, burning sensation of throat with constricting sensation of the larynx and difficulty in breathing
 Refer to section 11

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

No data available

SECTION 5: Firefighting measures

5.1. Extinguishing media


Suitable extinguishing media	Carbon dioxide, chemical powders and special foams, provided that any leakage could be stopped. In the opposite case, it is preferable to keep any other combustible element away from the flame and to allow it to burn Cool the exposed or exposed drums with water mist, knowing that the ethylene oxide continues to burn in the presence of water until dilution in 22 times its volume
Unsuitable extinguishing media	Do not use a water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards	In case of fire or excessive heat, hazardous combustion products may be produced Exposure to fire may cause containers to rupture/explode
Hazardous combustion products	In case of fire or excessive heat, hazardous combustion products may be produced such as : carbon oxides

5.3. Additional information

Exposure to fire may cause containers to rupture/explode

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, spray mists or gases
 Provide adequate ventilation
 Remove all sources of ignition
 Evacuate the staff to safe place
 Beware of vapours that accumulate forming explosive concentrations
 Vapours may accumulate in low areas
 Personal protective equipment, see section 8

6.2. Environmental precautions

Try to stop the leak

6.3. Methods and material for containment and cleaning up

Ventilate the area
 Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost)

6.4. Reference to other sections

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling


Avoid contact with skin and eyes. Avoid breathing vapour or mist
 Keep away from sources of ignition - No smoking Take measures to prevent the accumulation of electrostatic charges
 For precautions, see section 2.2

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool place. Keep container tightly closed in a dry and well-ventilated place
 Recommended storage temperature 2 - 8 ° C

7.3. Specific end use(s)

None

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SECTION 8: Exposure controls/personal protection
8.1. Control parameters
Components with occupational exposure limits

Component	CAS N°	Exposure value type	Control parameter	Source
Carbone dioxide	124-38-9	TWA	5000 ppm	SUVA: Limit values of exposure to workstations
			9000 mg/m ³	
		OEL	-	SUVA: Limit values of exposure to workstations
			-	
Ethylene oxide	75-21.8	TWA	1 ppm	SUVA: Limit values of exposure to workstations
			2 mg/m ³	
		OEL	-	SUVA: Limit values of exposure to workstations
			-	

8.2. Exposure controls
8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation
 Gas detectors should be used when toxic gases may be released

8.2.2. Individual protection measures, e.g. personal protective equipment
Eye/face protection

Wear goggles and a face shield when transfilling or breaking transfer connections

Standard EN 166 - Personal eye-protection - specifications

Skin / hand protection

Wear protective gloves when handling gas cylinders. Standard EN 388

Wear cold insulating gloves when transferring or disconnecting transfer lines Standard EN 511

Wearing chemical resistant gloves Standard EN 374

For short-term use

Material: Butyl rubber

Penetration time:> 10 min

Glove thickness: 0.3 mm

For long-term use

Material: Butyl rubber

Penetration time:> 480 min

Glove thickness: 0.7 mm

Have appropriate, chemical-resistant protective clothing ready for use in emergencies. Standard EN943-1

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Respiratory protection

Self-contained breathing apparatus (SCBA) or positive pressure air mask must be used in oxygenated atmospheres. Standard EN 137 - Self-contained compressed air device with a full face mask

8.2.3. Environmental exposure controls

-

SECTION 9: Physical and chemical properties
9.1. Information on basic physical and chemical properties
Appearance

- **Physical state at 20°C / 101.3kPa** Gas
- **Colour** Colourless

Odour Ether

Odour threshold No data available

pH No data available

Melting point / Freezing point No data available

Boiling point No data available

Flash point -57°C (closed cup)

Evaporation rate No data available

Flammability (solid, gas) Extremely flammable gas

Explosive limits 2.6 – 100%

Vapour pressure [20°C] 1.4 bar

Vapour pressure [50°C] 3.95 bar

Vapour density No data available

Relative density, liquid (water=1) No data available

Relative density, gas (air=1) 1.5

Water solubility No data available

Partition coefficient No data available

n-octanol/water (Log Kow)
Auto-ignition temperature 429°C

Decomposition temperature approx. 560°C


Viscosity No data available

Explosive properties No data available

Oxidising properties No data available

9.2. Other information
Molar mass approx.

Critical temperature [°C] 196°C

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Relative vapour density

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No data available

10.2. Chemical stability

Stable under recommended storage conditions

May polymerise

May react explosively even in the absence of air

10.3. Possibility of hazardous reactions

Can form explosive mixture with air

May react violently with oxidants

Ethylene oxide is an extremely reactive compound. It reacts violently or can explosively polymerize at high temperatures or in case of contamination by acids, bases, salts, combustible materials, oxidants, iron, aluminium, boron and tin chlorides, iron oxides (rust) and aluminium

With water, the product forms hydrates that precipitate below 12 ° C and can dangerously clog the pipes

Ethylene oxide may contain, in the form of impurities, traces of acetylene which, in contact with certain metal powders such as copper, silver, mercury or magnesium, may give rise to unstable acetylides, sources of explosion

10.4. Conditions to avoid

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

10.5. Incompatible materials

Alcohols, alkali metals, ammonia, oxidants, chemically active metals and their salts

For more information on compatibility, refer to ISO 11114

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions: carbon oxides

SECTION 11: Toxicological information

11.1. Chemical safety assessment

Acute toxicity

Toxic if inhaled

Skin corrosion/irritation

Causes skin irritation

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Serious eye damage/irritation	Causes serious eye irritation
Respiratory or skin sensitisation	No data available
Germ cell mutagenicity	May cause genetic defects
Carcinogenicity	May cause cancer
Reproductive toxicity	No data available
STOT-single exposure – Target organ(s)	May cause respiratory irritation Damage to red blood cells (haemolytic poison)
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure Damage to red blood cells (haemolytic poison)
Ingestion hazard	No data available

SECTION 12: Ecological information

12.1. Toxicity

Assessment Toxic by inhalation

12.2. Persistence and degradability

The substance is readily biodegradable. Unlikely to persist

12.3. Bioaccumulative potential

Not expected to bioaccumulate due to the low log Kow (log Kow < 4)
 Refer to section 9

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

PBT / vPvB assessment is not available because the chemical safety assessment is not required / is not conducted


12.6. Other adverse effects

Harmful to aquatic organisms

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product Must not be discharged to atmosphere
 Burn in a chemical incinerator equipped with an afterburner and scrubber
 Return surplus and non-recyclable solutions to a licensed waste disposal company

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Contaminated container

Eliminate as unused product

Contact the supplier if instructions are needed

OMoD Code

16 05 04

Gases in pressure containers (incl. halon) containing dangerous substances

SECTION 14: Transport information

14.1. UN number

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
1041	1041	1041

14.2. UN proper shipping name

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
Ethylene oxide and carbon dioxide mixture (Ethylene oxide)	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE (Ethylene oxide)	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE (Ethylene oxide)

14.3. Transport hazard class(es)

Labelling



ADR/RID
IMDG
IATA

2.3 : Toxic gases
2.1 : Flammable gases

14.4. Packing group

ADR/RID
IMDG
IATA

Not established

14.5. Environmental hazards

ADR/RID

None

IMDG


None

ICAO-TI / IATA-DGR

None

14.6. Special precautions for user

No data available

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14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

This safety data sheet complies with the requirements of Regulation (CE) No. 1907/2006

15.2. Chemical safety assessment

A CSA has been carried out

SECTION 16: Other information

Indication of changes

Revised safety data sheet in accordance with commission regulation (EU) No 2015/830

Abbreviations and acronyms

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS : Chemical Abstract Service number (USA)

CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008

CSA : Chemical Safety Assessment

DNEL: Derived no effect level

EIGA : European Industrial Gases Association

EINECS : European Inventory of Existing Commercial Chemical Substances

EN : European Standard

ATE : Acute Toxicity Estimate

IATA : International Air Transport Association

IMDG Code : International Maritime Dangerous Goods Code

LC50 : Lethal Concentration to 50 % of a test population

OMoD : Swiss Ordinance on the movement of waste

PBT : Persistent, Bioaccumulative and Toxic

PPE: Personal Protection Equipment

REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006

RID : Regulations concerning the international carriage of dangerous goods by rail


RMM : Risk Management Measures

STOT-SE : Specific Target Organ Toxicity - Single Exposure

UN : United Nations

vPvB : Very Persistent and Very Bioaccumulative

WGK: Water Hazards Class

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Full text of H, EUH and P statements used in sections 2 and 3

Hazard statements

H220	Extremely flammable gas
H230	May react explosively even in the absence of air
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation
H331	Toxic if inhaled
H335	May cause respiratory irritation
H340	May cause genetic defects
H350	May cause cancer
H372	Causes damage to organs through prolonged or repeated exposure

Precautionary statements

P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P260	Do not breathe gas, vapours
P280	Wear protective gloves, protective clothing, eye protection, face protection
P302+P352	IF ON SKIN: Wash with plenty of water
P304+P340+P315	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention
P305+P351+P338+P315	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention
P308+P313	IF exposed or concerned: Get medical advice
P332+P313	If skin irritation occurs: Get medical advice/attention
P405	Store locked up
P410+P403	Protect from sunlight. Store in a well-ventilated place

Disclaimer of liability

Details given in this document have been prepared based on the most available reliable documents and are believed to be correct at the time of going to press
They do not claim to be exhaustive and should be considered as a guide