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

1.1. Product identifier

Trade name	Ethylene oxide
Chemical description	Ethylene oxide
CAS N°	75-21-8
CE N°	200-849-9
Index N°	603-023-00-X
Registration n°	01-2119432402-53
Chemical formula	C_2H_4O

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

Gases under pressure : Liquefied gas	H280
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	H350
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 GHS06 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
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
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381	In case of leakage, eliminate all ignition sources
P410+P403	Protect from sunlight. Store in a well-ventilated place
P405	Store locked up

2.3. Other hazards

None

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Concentration	Classification
Ethylene oxide	(CAS-No.) 75-21-8 (EC-No.) 200-849-9 (EC Index-No.) 603-023-00-X (Registration-No.) 01-2119432402-53	<= 100%	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

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	-

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 monoxide

5.3. Additional information

Exposure to fire may cause containers to rupture/explode

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

Content under pressure

Recommended storage temperature 2 - 8 ° C

7.3. Specific end use(s)

None

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Components with occupational exposure limits

Component	CAS N°	Exposure value type	Control parameter	Source
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

Product to be handled in a closed system

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

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	No data available
Odour threshold	No data available
pH	No data available
Melting point / Freezing point	-112°C
Boiling point	10.4°C
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)	0.89
Relative density, gas (air=1)	1.5
Water solubility	No data available
Partition coefficient n-octanol/water (Log Kow)	0.3
Auto-ignition temperature	429°C
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2. Other information

Molar mass	44 g/mol
Critical temperature [°C]	196°C
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

Containers are commonly pressurised to 5-7 bars with nitrogen

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 oxide

SECTION 11: Toxicological information

11.1. Chemical safety assessment

Acute toxicity	Toxic if inhaled
Skin corrosion/irritation	Causes skin irritation
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 May cause irritation to the respiratory tract 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 No data available

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

May cause pH changes in aqueous ecological systems

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
Contaminated container	Eliminate as unused product Contact the supplier if instructions are needed
OMoD Code	16 05 04 Gases in pressure containers 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
1040	1040	1040

14.2. UN proper shipping name

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

14.3. Transport hazard class(es)

Labelling

ADR/RID	2.3 : Toxic gases
IMDG	2.1 : Flammable gases
IATA	

14.4. Packing group

ADR/RID	Not established
IMDG	
IATA	

14.5. Environmental hazards

ADR/RID	None
IMDG	None
ICAO-TI / IATA-DGR	None

14.6. Special precautions for user

No data available

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

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

Hazard statements

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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