

**SAFETY DATA SHEET**  
**C2H4O 6 %;CO2 94 %**Issue Date: 20.12.2012  
Last revised date: 12.08.2015

Version: 1.0

SDS No.: 000010017379  
1/15**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier****Product name:** C2H4O 6 %;CO2 94 %**Trade name:** Gasart 386 Sterilisiergas 6 % Ethylenoxid, Rest Kohlendioxid**1.2 Relevant identified uses of the substance or mixture and uses advised against****Identified uses:** Industrial and professional. Perform risk assessment prior to use.**Uses advised against** Consumer use.**1.3 Details of the supplier of the safety data sheet****Supplier**Linde Gas GmbH  
Carl-von-Linde-Platz 1  
A-4651 Stadl-Paura**Telephone:** +43 50 4273**E-mail:** office@at.linde-gas.com**1.4 Emergency telephone number:** Emergency number Linde: + 43 50 4273 (during business hours), Poisoning Information Center: +43 1 406 43 43**SECTION 2: Hazards identification****2.1 Classification of the substance or mixture****Classification according to Directive 67/548/EEC or 1999/45/EC as amended.**

R6 Carc. 2; R45 Muta. 2; R46 T; R23 Xi; R36/37/38

The full text for all R-phrases is displayed in section 16.

**Classification according to Regulation (EC) No 1272/2008 as amended.****Physical Hazards**

Gases under pressure

Compressed gas

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

**Health Hazards**

Germ Cell Mutagenicity

Category 1B

H340: May cause genetic defects.

Carcinogenicity

Category 1B

H350: May cause cancer.

Specific Target Organ Toxicity -  
Single Exposure

Category 3

H335: May cause respiratory irritation.

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### 2.2 Label Elements

**Contains:** Ethylene oxide



**Signal Words:** Danger

**Hazard Statement(s):**  
H280: Contains gas under pressure; may explode if heated.  
H335: May cause respiratory irritation.  
H340: May cause genetic defects.  
H350: May cause cancer.

### Precautionary Statement

**Prevention:**  
P202: Do not handle until all safety precautions have been read and understood.  
P260: Do not breathe gas/vapors.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.

**Response:**  
P304+P340+P315: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice/attention.  
P308+P313: IF exposed or concerned: Get medical advice/attention.

**Storage:** P403: Store in a well-ventilated place.

**Disposal:** None.

**Supplemental label information**  
Restricted to professional users.

**2.3 Other hazards:** None.

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

Chemical name	Chemical formula	Concentration	CAS-No.	EC No.	REACH Registration No.	Notes
Ethylene oxide	C2H4O	6%	75-21-8	200-849-9	01-2119432402-53	#
Carbon dioxide	CO2	94%	124-38-9	204-696-9	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.	#

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The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.

# This substance has workplace exposure limit(s).

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

## Classification

Chemical name	Classification		Notes
Ethylene oxide	DSD:	R6 F+; R12 Carc. 2; R45 Muta. 2; R46 T; R23 Xi; R36/37/38	
	CLP:	Chem. Unst. Gas A;H230, Flam. Gas 1;H220, Press. Gas Liquef. Gas;H280, Carc. 1B;H350, Muta. 1B;H340, Acute Tox. 3;H331, Eye Irrit. 2;H319, STOT SE 3;H335, Skin Irrit. 2;H315	
Carbon dioxide	DSD:	none	
	CLP:	Press. Gas Liquef. Gas;H280	

DSD: Directive 67/548/EEC.

CLP: Regulation No. 1272/2008.

The full text for all R-phrases and H-statements is displayed in section 16.

## SECTION 4: First aid measures

**General:** Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

## 4.1 Description of first aid measures

**Inhalation:** Low concentrations of CO2 cause increased respiration and headache. 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:** Adverse effects not expected from this product.

**Skin Contact:** Adverse effects not expected from this product.

**Ingestion:** Ingestion is not considered a potential route of exposure.

**4.2 Most important symptoms and effects, both acute and delayed:** Danger of serious damage to health by prolonged exposure.

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

**Hazards:** Danger of serious damage to health by prolonged exposure.

**Treatment:** Get immediate medical advice/attention.

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Guideline: EN 943-2 Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for gas-tight (Type 1) chemical protective suits for emergency teams (ET)**SECTION 6: Accidental release measures****6.1 Personal precautions, protective equipment and emergency procedures:** Evacuate area. Provide adequate ventilation. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.**6.2 Environmental Precautions:** Prevent further leakage or spillage if safe to do so. Reduce vapour with fog or fine water spray. Keep run-off water out of sewers and water sources. Dike for water control.**6.3 Methods and material for containment and cleaning up:** Provide adequate ventilation.**6.4 Reference to other sections:** Refer to sections 8 and 13.

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**SECTION 7: Handling and storage:****7.1 Precautions for safe handling:**

Only experienced and properly instructed persons should handle gases under pressure. Avoid exposure - obtain special instructions before use. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Installation of a cross purge assembly between the container and the regulator is recommended. Excess pressure must be vented through an appropriate scrubber system. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Damaged valves should be reported immediately to the 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. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

**7.2 Conditions for safe storage, including any incompatibilities:**

Containers should not be stored in conditions likely to encourage corrosion. Keep away from food, drink and animal feeding stuffs. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

**7.3 Specific end use(s):**

None.

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## SECTION 8: Exposure controls/personal protection

## 8.1 Control Parameters

## Occupational Exposure Limits

Chemical name	type	Exposure Limit Values		Source
Carbon dioxide	TWA	5.000 ppm	9.000 mg/m3	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU (12 2009)
	MAK	5.000 ppm	9.000 mg/m3	Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)
	MAK CEIL	10.000 ppm	18.000 mg/m3	Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)
Ethylene oxide	TRK	1 ppm	2 mg/m3	Austria. TRK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)
	TRK STEL	4 ppm	8 mg/m3	Austria. TRK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)

## DNEL-Values

Critical component	type	Value	Remarks
Ethylene oxide	Worker - inhalative, short-term - systemic	5 mg/m3	-
	Worker - inhalative, long-term - systemic	1,6 mg/m3	-

## PNEC-Values

Critical component	type	Value	Remarks
Ethylene oxide	Aquatic (freshwater)	0,084 mg/l	-
	Aquatic (intermit. releases)	0,84 mg/l	-
	Sediment (marine water)	0,0329 mg/kg	-
	Sewage treatment plant	13 mg/l	-
	Soil	0,0165 mg/kg	-
	Aquatic (marine water)	0,0084 mg/l	-
	Sediment (freshwater)	0,329 mg/kg	-

## 8.2 Exposure controls

**Appropriate engineering controls:** No data available.

**Individual protection measures, such as personal protective equipment**

**General information:** No data available.

**Eye/face protection:** No data available.

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<b>Skin protection</b>	
<b>Hand Protection:</b>	No data available.
<b>Body protection:</b>	No special precautions.
<b>Other:</b>	not applicable.
<b>Respiratory Protection:</b>	not applicable.
<b>Thermal hazards:</b>	not applicable.
<b>Hygiene measures:</b>	not applicable.
<b>Environmental exposure controls:</b>	not applicable.

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

<b>Physical state:</b>	Gas
<b>Form:</b>	Compressed gas
<b>Color:</b>	C2H4O: Colorless CO2: Colorless
<b>Odor:</b>	C2H4O: Ether-like odor CO2: Odorless
<b>Odor Threshold:</b>	Odor threshold is subjective and is inadequate to warn of over exposure.
<b>pH:</b>	not applicable.
<b>Melting Point:</b>	No data available.
<b>Boiling Point:</b>	No data available.
<b>Sublimation Point:</b>	not applicable.
<b>Critical Temp. (°C):</b>	No data available.
<b>Flash Point:</b>	Not applicable to gases and gas mixtures.
<b>Evaporation Rate:</b>	Not applicable to gases and gas mixtures.
<b>Flammability (solid, gas):</b>	This product is not flammable.
<b>Flammability Limit - Upper (%):</b>	not applicable.
<b>Flammability Limit - Lower (%):</b>	not applicable.
<b>Vapor pressure:</b>	No reliable data available.
<b>Vapor density (air=1):</b>	1,55 (calculated) (15 °C)
<b>Relative density:</b>	No data available.
<b>Solubility(ies)</b>	
<b>Solubility in Water:</b>	No data available.
<b>Partition coefficient (n-octanol/water):</b>	Not known.
<b>Autoignition Temperature:</b>	not applicable.

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8/15**Decomposition Temperature:** Not known.**Viscosity****Kinematic viscosity:** No data available.**Dynamic viscosity:** No data available.**Explosive properties:** Not applicable.**Oxidizing properties:** not applicable.**9.2 Other information:** 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 reactivity hazard other than the effects described in sub-section below.**10.2 Chemical Stability:** Stable under normal conditions.**10.3 Possibility of Hazardous Reactions:** No data available.**10.4 Conditions to Avoid:** Avoid moisture in the installation.**10.5 Incompatible Materials:** Moisture. For material compatibility see latest version of ISO-11114.**10.6 Hazardous Decomposition Products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced.**SECTION 11: Toxicological information****General information:** None.**11.1 Information on toxicological effects****Acute toxicity - Oral Product** Based on available data, the classification criteria are not met.**Acute toxicity - Dermal Product** Based on available data, the classification criteria are not met.**Acute toxicity - Inhalation Product** ATEmix (4 h): > 20000 ppm**Component Information**  
Ethylene oxide LC 50 (Rat, 1,0 h): 2900 ppm



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9/15**Skin Corrosion/Irritation****Product**

Based on available data, the classification criteria are not met.

**Component Information**

Ethylene oxide

Irritating

**Serious Eye Damage/Eye Irritation****Product**

Based on available data, the classification criteria are not met.

**Component Information**

Ethylene oxide

Irritating

**Respiratory or Skin Sensitization****Product**

Based on available data, the classification criteria are not met.

**Germ Cell Mutagenicity****Product**

May cause genetic defects.

**Carcinogenicity****Product**

May cause cancer.

**Reproductive toxicity****Product**

Based on available data, the classification criteria are not met.

**Specific Target Organ Toxicity - Single Exposure****Product**

May cause respiratory irritation.

**Component Information**

Ethylene oxide

Causes damage to red blood cells (haemolytic poison). Causes irritation to the respiratory tract

**Specific Target Organ Toxicity - Repeated Exposure****Product**

Based on available data, the classification criteria are not met.

**Component Information**

Ethylene oxide

Causes damage to red blood cells (haemolytic poison).

**Aspiration Hazard****Product**

Not applicable to gases and gas mixtures..

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10/15**SECTION 12: Ecological information****12.1 Toxicity****Acute toxicity****Product**

No ecological damage caused by this product.

**Acute toxicity - Fish****Component Information**

Ethylene oxide

LC 50 (Fathead minnow (*Pimephales promelas*), 96 h): 73 - 96 mg/l (Static)  
Remarks: Mortality**Acute toxicity - Aquatic Invertebrates****Component Information**

Ethylene oxide

LC 50 (Water flea (*Daphnia magna*), 48 h): 150 - 243 mg/l (Static) Remarks:  
Mortality**Toxicity to microorganisms****Component Information**

Ethylene oxide

EC50 (Alga, 72 h): 240 mg/l

**12.2 Persistence and Degradability****Product**

Not applicable to gases and gas mixtures..

**12.3 Bioaccumulative Potential****Product**

The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

**12.4 Mobility in Soil****Product**

Because of its high volatility, the product is unlikely to cause ground or water pollution.

**12.5 Results of PBT and vPvB assessment****Product**

Not classified as PBT or vPvB.

**12.6 Other Adverse Effects:****Global Warming Potential**Global warming potential: 0,9  
When discharged in large quantities may contribute to the greenhouse effect.**Component Information**

Carbon dioxide

Global warming potential: 1

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11/15**SECTION 13: Disposal considerations****13.1 Waste treatment methods****General information:** Avoid discharges to atmosphere. Consult supplier for specific recommendations.**Disposal methods:** 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. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.**European Waste Codes****Container:** 16 05 04\*: Gases in pressure containers (including halons) containing dangerous substances.**SECTION 14: Transport information****ADR**

14.1 UN Number: UN 1956  
14.2 UN Proper Shipping Name: COMPRESSED GAS, N.O.S.(Carbon Dioxide, Ethylene Oxide)  
14.3 Transport Hazard Class(es)  
Class: 2  
Label(s): 2.2  
Hazard No. (ADR): 20  
Tunnel restriction code: (E)  
14.4 Packing Group: -  
14.5 Environmental hazards: not applicable  
14.6 Special precautions for user: -

**RID**

14.1 UN Number: UN 1956  
14.2 UN Proper Shipping Name: COMPRESSED GAS, N.O.S.(Carbon Dioxide, Ethylene Oxide)  
14.3 Transport Hazard Class(es)  
Class: 2  
Label(s): 2.2  
14.4 Packing Group: -  
14.5 Environmental hazards: not applicable  
14.6 Special precautions for user: -

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14.1 UN Number: UN 1956  
14.2 UN Proper Shipping Name: COMPRESSED GAS, N.O.S.(Carbon Dioxide, Ethylene Oxide)  
14.3 Transport Hazard Class(es)  
Class: 2.2  
Label(s): 2.2  
EmS No.: F-C, S-V  
14.3 Packing Group: -  
14.5 Environmental hazards: not applicable  
14.6 Special precautions for user: -

**IATA**

14.1 UN Number: UN 1956  
14.2 Proper Shipping Name: Compressed gas, n.o.s.(Carbon Dioxide, Ethylene Oxide)  
14.3 Transport Hazard Class(es):  
Class: 2.2  
Label(s): 2.2  
14.4 Packing Group: -  
14.5 Environmental hazards: not applicable  
14.6 Special precautions for user: -  
Other information  
Passenger and cargo aircraft: Allowed.  
Cargo aircraft only: Allowed.

**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** not applicable**Additional identification:**

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. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

**SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:****EU Regulations****Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:**

The packaging shall be visibly, legibly and indelibly marked as follows:  
Restricted to professional users.

Chemical name	CAS-No.	Concentration
Ethylene oxide	75-21-8	1,0 - 10%

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Chemical name	CAS-No.	Concentration
Ethylene oxide	75-21-8	1,0 - 10%

**Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.:**

Chemical name	CAS-No.	Concentration
Ethylene oxide	75-21-8	1,0 - 10%

**Directive 96/61/EC: concerning integrated pollution prevention and control (IPPC): Article 15, European Pollution Emission Registry (EPER):**

Chemical name	CAS-No.	Concentration
Carbon dioxide	124-38-9	90 - 100%
Ethylene oxide	75-21-8	1,0 - 10%

**Directive 96/82/EC (Seveso II): on the control of major accident hazards involving dangerous substances:**

Chemical name	CAS-No.	Concentration
Ethylene oxide	75-21-8	1,0 - 10%

**Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:**

Chemical name	CAS-No.	Concentration
Ethylene oxide	75-21-8	1,0 - 10%

**National Regulations**

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 89/686/EEC on personal protective equipment Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.

This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

**15.2 Chemical safety assessment:** No Chemical Safety Assessment has been carried out.

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## SECTION 16: Other information

**Revision Information:** Not relevant.

**Key literature references and sources for data:**

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:

Agency for Toxic Substances and Diseases Registry (ATSDR)  
 (<http://www.atsdr.cdc.gov/>).

European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.  
 European Chemical Agency: Information on Registered Substances  
<http://apps.echa.europa.eu/registered/registered-sub.aspx#search>

European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.

International Programme on Chemical Safety (<http://www.inchem.org/>)

ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.

Matheson Gas Data Book, 7th Edition.

National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.

The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).

The European Chemical Industry Council (CEFIC) ERICards.

United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)

Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).

Substance specific information from suppliers.

Details given in this document are believed to be correct at the time of publication.

**Wording of the R-phrases and H-statements in section 2 and 3**

H220	Extremely flammable gas.
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.
R6	Explosive with or without contact with air.
R12	Extremely flammable.
R23	Toxic by inhalation.
R36/37/38	Irritating to eyes, respiratory system and skin.
R45	May cause cancer.
R46	May cause heritable genetic damage.

**Training information:** Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard.

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Muta. 1B, H340

Carc. 1B, H350

STOT SE 3, H335

Press. Gas Compr. Gas, H280

**Other information:**

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

**Last revised date:**

12.08.2015

**Disclaimer:**

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.