

Ethylene oxide >87% / Carbon dioxide

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

1.1. Product identifier

| | |
|----------------------------------|--|
| Product name | : Ethylene oxide >87% / Carbon dioxide |
| Synonyms | : carbon dioxide/ethylene oxide, mixtures, conc ethylene oxide>87%; carbon dioxide/ethylene oxide, mixtures, conc carbon dioxide<13%; ethylene oxide/carbon dioxide, mixtures, conc carbon dioxide<13%; ethylene oxide/carbon dioxide, mixtures, conc ethylene oxide>87% |
| Registration number REACH | : Not applicable (mixture) |
| Product type REACH | : Mixture |
| Formula | : C ₂ H ₄ O+CO ₂ |

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

1.2.1 Relevant identified uses

Industrial use
Biocide

1.2.2 Uses advised against

No uses advised against

1.3. Details of the supplier of the safety data sheet

Supplier of the safety data sheet

CHEMOGAS NV
Westvaartdijk 85
B-1850 Grimbergen Belgium
☎ +32 2 251 60 87
✉ +32 2 252 17 51
info@chemogas.com

Distributor of the product

CHEMOGAS NV
Westvaartdijk 85
B-1850 Grimbergen Belgium
☎ +32 2 251 60 87
✉ +32 2 252 17 51
info@chemogas.com

1.4. Emergency telephone number

24h/24h (Telephone advice: English, French, German, Dutch):
+32 14 58 45 45 (BIG)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

| Class | Category | Hazard statements |
|-----------------|---------------|--|
| Flam. Gas | category 1 | H220: Extremely flammable gas. |
| Press. Gas | Liquefied gas | H280: Contains gas under pressure; may explode if heated. |
| Chem. Unst. Gas | Category A | H230: May react explosively even in the absence of air. |
| Carc. | category 1B | H350: May cause cancer. |
| Muta. | category 1B | H340: May cause genetic defects. |
| Acute Tox. | category 3 | H331: Toxic if inhaled. |
| STOT RE | category 1 | H372: Causes damage to organs (central nervous system) through prolonged or repeated exposure. |
| Acute Tox. | category 4 | H302: Harmful if swallowed. |
| Skin Irrit. | category 2 | H315: Causes skin irritation. |
| Eye Irrit. | category 2 | H319: Causes serious eye irritation. |
| STOT SE | category 3 | H335: May cause respiratory irritation. |

2.2. Label elements



Ethylene oxide >87% / Carbon dioxide



Contains: ethylene oxide.

Signal word Danger

H-statements

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

P-statements

| | |
|--------------------|--|
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P280 | Wear protective gloves, protective clothing and eye protection/face protection. |
| P260 | Do not breathe gas. |
| P304 + P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P330 | Rinse mouth. |

Supplemental information

Restricted to professional users.

2.3. Other hazards

- Gas/vapour spreads at floor level: ignition hazard
- Odour threshold is well above the exposure limit
- Produces effects on the nervous system
- May cause frostbites
- Caution! Substance is absorbed through the skin

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

| Name REACH Registration No | CAS No EC No | Conc. (C) | Classification according to CLP | Note | Remark |
|------------------------------------|-----------------------|-----------|--|---------------|-------------|
| ethylene oxide 01-2119432402-53 | 75-21-8 200-849-9 | C>87 % | Flam. Gas 1; H220 Press. Gas - Liquefied gas; H280 Chem. Unst. Gas A; H230 Carc. 1B; H350 Muta. 1B; H340 Acute Tox. 3; H331 STOT RE 1; H372 Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Irrit. 2; H319 STOT SE 3; H335 | (1)(2)(6)(10) | Constituent |
| carbon dioxide | 124-38-9 204-696-9 | C<13 % | Press. Gas - Liquefied gas; H280 | (1)(2) | Constituent |

(1) For H-statements in full: see heading 16

(2) Substance with a Community workplace exposure limit

(6) Enumerated in Annex VI of Regulation (EC) No. 1272/2008 but the classification has been adapted after evaluation of available test data

(10) Subject to restrictions of Annex XVII of Regulation (EC) No. 1907/2006

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SECTION 4: First aid measures

4.1. Description of first aid measures

General:

Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with laboured breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital.

After inhalation:

Remove the victim into fresh air. Immediately consult a doctor/medical service. Do not apply mouth-to-mouth resuscitation.

After skin contact:

Wash immediately with lots of water. Soap may be used. Take victim to a doctor if irritation persists. In case of frostbites: Wash immediately with lots of water (15 minutes)/shower. Do not tear off solidified product from the skin. Remove clothing while washing. Do not remove clothing if it sticks to the skin. Cover wounds with sterile bandage. Consult a doctor/medical service. If burned surface > 10%: take victim to hospital.

After eye contact:

Rinse immediately with plenty of water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Do not apply neutralizing agents. Take victim to an ophthalmologist.

After ingestion:

Not applicable.

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

4.2.1 Acute symptoms

After inhalation:

Dry/sore throat. Irritation of the respiratory tract. Irritation of the nasal mucous membranes. Central nervous system depression. Nausea. Vomiting. Headache. Dizziness. Disturbances of consciousness. EXPOSURE TO HIGH CONCENTRATIONS: Disturbances of heart rate. Respiratory difficulties. FOLLOWING SYMPTOMS MAY APPEAR LATER: Cramps/uncontrolled muscular contractions. Risk of lung oedema.

After skin contact:

Frostbites. Tingling/irritation of the skin. FOLLOWING SYMPTOMS MAY APPEAR LATER: Swelling of the skin. Red skin. Blisters. May stain the skin. AFTER CONTACT WITH WATER: Caustic burns/corrosion of the skin.

After eye contact:

Irritation of the eye tissue. Frostbites.

After ingestion:

Risk of aspiration pneumonia.

4.2.2 Delayed symptoms

No effects known.

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

If applicable and available it will be listed below.

SECTION 5: Firefighting measures

5.1. Extinguishing media

5.1.1 Suitable extinguishing media:

Small fire: Quick-acting ABC powder extinguisher, Quick-acting BC powder extinguisher.

5.1.2 Unsuitable extinguishing media:

Small fire: Quick-acting CO2 extinguisher, Water (water can be used to control jet flame), Foam.

Major fire: Water (water can be used to control jet flame), Foam.

5.2. Special hazards arising from the substance or mixture

Upon combustion: CO and CO2 are formed. Polymerizes on exposure to temperature rise.

5.3. Advice for firefighters

5.3.1 Instructions:

If no hazard for/from the surroundings: controlled burning. If hazardous substances are nearby: consider extinguishment. Extinguish only if gas supply/leak can be shut afterwards. Cool tanks/drums with water spray/remove them into safety. Physical explosion risk: extinguish/cool from behind cover. Do not move the load if exposed to heat. After cooling: persistent risk of physical explosion. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.

5.3.2 Special protective equipment for fire-fighters:

Insulating gloves. Protective goggles. Head/neck protection. Protective clothing. Large spills/in enclosed spaces: gas-tight suit. Compressed air/oxygen apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Keep upwind. Seal off low-lying areas. Close doors and windows of adjacent premises. Stop engines and no smoking. No naked flames or sparks. Spark- and explosionproof appliances and lighting equipment. Avoid ingress of water in the containers.

6.1.1 Protective equipment for non-emergency personnel

See heading 8.2

6.1.2 Protective equipment for emergency responders

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Insulating gloves. Protective goggles. Head/neck protection. Protective clothing. Large spills/in enclosed spaces: gas-tight suit.

Suitable protective clothing

See heading 8.2

6.2. Environmental precautions

Contain released product, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Tip the container on one side to stop the leakage. Try to reduce evaporation. Take account of toxic/corrosive precipitation water. Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up

Damaged/cooled tanks must be emptied. Do not use compressed air for pumping over spills. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

6.4. Reference to other sections

See heading 13.

SECTION 7: Handling and storage

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

7.1. Precautions for safe handling

Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Gas/vapour heavier than air at 20°C. Observe strict hygiene. Remove contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

7.2.1 Safe storage requirements:

Storage temperature: < 50 °C. Store in a cool area. Ventilation at floor level. Fireproof storeroom. Provide for an automatic sprinkler system. Provide for a tub to collect spills. Provide the tank with earthing. Unauthorized persons are not admitted. Keep only in the original container. Meet the legal requirements.

7.2.2 Keep away from:

Heat sources, ignition sources, combustible materials, oxidizing agents, metals.

7.2.3 Suitable packaging material:

Steel, stainless steel, synthetic material.

7.2.4 Non suitable packaging material:

Aluminium, iron, copper, tin.

7.3. Specific end use(s)

If applicable and available, exposure scenarios are attached in annex. See information supplied by the manufacturer.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 Occupational exposure

a) Occupational exposure limit values

If limit values are applicable and available these will be listed below.

EU

| | | |
|----------------|---|------------------------|
| Carbon dioxide | Time-weighted average exposure limit 8 h (Indicative occupational exposure limit value) | 5000 ppm |
| | Time-weighted average exposure limit 8 h (Indicative occupational exposure limit value) | 9000 mg/m ³ |

Belgium

| | | |
|----------------------|--|-----------------------------|
| Carbone (dioxyde de) | Time-weighted average exposure limit 8 h | 5000 ppm (A) |
| | Time-weighted average exposure limit 8 h | 9131 mg/m ³ (A) |
| | Short time value | 30000 ppm (A) |
| | Short time value | 54784 mg/m ³ (A) |
| Oxyde d'éthylène | Time-weighted average exposure limit 8 h | 1 ppm |
| | Time-weighted average exposure limit 8 h | 1.8 mg/m ³ |

La mention "A" signifie que l'agent libère un gaz ou une vapeur qui n'ont en eux-mêmes aucun effet physiologique mais peuvent diminuer le taux d'oxygène dans l'air. Lorsque le taux d'oxygène descend en dessous de 17-18 % (vol/vol) le manque d'oxygène provoque des suffocations qu'aucun symptôme préalable n'annonce

The Netherlands

| | | |
|---------------|---|------------------------|
| Ethyleenoxide | Time-weighted average exposure limit 8 h (Public occupational exposure limit value) | 0.46 ppm |
| | Time-weighted average exposure limit 8 h (Public occupational exposure limit value) | 0.84 mg/m ³ |
| Kooldioxide | Time-weighted average exposure limit 8 h (Public occupational exposure limit value) | 4919 ppm |
| | Time-weighted average exposure limit 8 h (Public occupational exposure limit value) | 9000 mg/m ³ |

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France

| | | |
|----------------------|--|------------------------|
| Carbone (dioxyde de) | Time-weighted average exposure limit 8 h (VRI: Valeur réglementaire indicative) | 5000 ppm |
| | Time-weighted average exposure limit 8 h (VRI: Valeur réglementaire indicative) | 9000 mg/m ³ |
| Oxyde d'éthylène | Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative) | 1 ppm |
| | Short time value (VL: Valeur non réglementaire indicative) | 5 ppm |

Germany

| | | |
|-------------------|---|------------------------|
| Kohlenstoffdioxid | Time-weighted average exposure limit 8 h (TRGS 900) | 5000 ppm |
| | Time-weighted average exposure limit 8 h (TRGS 900) | 9100 mg/m ³ |

UK

| | | |
|----------------|---|-------------------------|
| Carbon dioxide | Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005)) | 5000 ppm |
| | Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005)) | 9150 mg/m ³ |
| | Short time value (Workplace exposure limit (EH40/2005)) | 15000 ppm |
| | Short time value (Workplace exposure limit (EH40/2005)) | 27400 mg/m ³ |
| Ethylene oxide | Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005)) | 5 ppm |
| | Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005)) | 9.2 mg/m ³ |

USA (TLV-ACGIH)

| | | |
|----------------|--|-----------|
| Carbon dioxide | Time-weighted average exposure limit 8 h (TLV - Adopted Value) | 5000 ppm |
| | Short time value (TLV - Adopted Value) | 30000 ppm |
| Ethylene oxide | Time-weighted average exposure limit 8 h (TLV - Adopted Value) | 1 ppm |

b) National biological limit values

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods

| Product name | Test | Number |
|---|-------|--------|
| Carbon Dioxide | NIOSH | 6603 |
| Carbon Dioxide | OSHA | ID 172 |
| Ethylene oxide (organic and inorganic gases by Extractive FTIR) | NIOSH | 3800 |
| Ethylene Oxide (Qazi-Ketcham) | NON | 14 |
| Ethylene Oxide | NIOSH | 1614 |
| Ethylene Oxide | NIOSH | 3702 |
| Ethylene Oxide | OSHA | 1010 |
| Ethylene Oxide | OSHA | 30 |
| Ethylene Oxide | OSHA | 49 |
| Ethylene Oxide | OSHA | 50 |

8.1.3 Applicable limit values when using the substance or mixture as intended

If limit values are applicable and available these will be listed below.

8.1.4 DNEL/PNEC values

DNEL/DMEL - Workers

ethylene oxide

| Effect level (DNEL/DMEL) | Type | Value | Remark |
|--------------------------|---------------------------------------|----------------------|--------|
| DMEL | Long-term systemic effects inhalation | 2 mg/m ³ | |
| DNEL | Acute systemic effects inhalation | 10 mg/m ³ | |

PNEC

ethylene oxide

| Compartments | Value | Remark |
|------------------------------|--------------------------|--------|
| Fresh water | 0.084 mg/l | |
| Marine water | 0.0084 mg/l | |
| Aqua (intermittent releases) | 0.84 mg/l | |
| STP | 13 mg/l | |
| Fresh water sediment | 0.329 mg/kg sediment dw | |
| Marine water sediment | 0.0329 mg/kg sediment dw | |
| Soil | 0.0165 mg/kg soil dw | |

8.1.5 Control banding

If applicable and available it will be listed below.

8.2. Exposure controls

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

8.2.1 Appropriate engineering controls

Ethylene oxide >87% / Carbon dioxide

Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Measure the concentration in the air regularly. Work under local exhaust/ventilation.

8.2.2 Individual protection measures, such as personal protective equipment

Observe strict hygiene. Do not eat, drink or smoke during work.

a) Respiratory protection:

Wear gas mask with filter type A if conc. in air > exposure limit. High vapour/gas concentration: self-contained respirator.

b) Hand protection:

Insulated gloves.

- materials (good resistance)

Butyl rubber.

c) Eye protection:

Protective goggles.

d) Skin protection:

Head/neck protection. Protective clothing.

8.2.3 Environmental exposure controls:

See headings 6.2, 6.3 and 13

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---------------------------|---|
| Physical form | Gas |
| Odour | Medicinal odour Ether-like odour |
| Odour threshold | No data available |
| Colour | Colourless |
| Particle size | Not applicable (gas) |
| Explosion limits | No data available |
| Flammability | Extremely flammable gas. |
| Log Kow | Not applicable (mixture) |
| Dynamic viscosity | No data available |
| Kinematic viscosity | No data available |
| Melting point | No data available |
| Boiling point | No data available |
| Flash point | No data available |
| Evaporation rate | No data available |
| Relative vapour density | 1.5 |
| Vapour pressure | No data available |
| Solubility | Water ; > 80 g/100 ml Ethanol ; soluble Ether ; soluble |
| Relative density | No data available |
| Decomposition temperature | No data available |
| Auto-ignition temperature | No data available |
| Explosive properties | No chemical group associated with explosive properties |
| Oxidising properties | No chemical group associated with oxidising properties |
| pH | No data available |

9.2. Other information

| | |
|----------------------|---------|
| Critical temperature | > 70 °C |
|----------------------|---------|

SECTION 10: Stability and reactivity

10.1. Reactivity

May be ignited by sparks. Gas/vapour spreads at floor level: ignition hazard.

10.2. Chemical stability

Unstable on exposure to heat.

10.3. Possibility of hazardous reactions

May react explosively even in the absence of air. Reacts violently with many compounds e.g.: with (strong) oxidizers: (increased) risk of fire/explosion. Reacts violently with many compounds e.g.: with (strong) oxidizers: (increased) risk of fire/explosion.

10.4. Conditions to avoid

Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks.

10.5. Incompatible materials

Combustible materials, oxidizing agents, metals.

10.6. Hazardous decomposition products

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Ethylene oxide >87% / Carbon dioxide

Upon combustion: CO and CO₂ are formed.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

11.1.1 Test results

Acute toxicity

Ethylene oxide >87% / Carbon dioxide

No (test) data on the mixture available

Classification is based on the relevant ingredients

As the substance is a gas, inhalation is the most likely route of exposure

ethylene oxide

| Route of exposure | Parameter | Method | Value | Exposure time | Species | Value determination | Remark |
|--------------------|-----------|--------|---------------|---------------|------------|---------------------|------------------|
| Oral | LD50 | Other | 330 mg/kg bw | | Rat (male) | Experimental value | Aqueous solution |
| Dermal | | | | | | Data waiving | |
| Inhalation (gases) | LC50 | Other | 2.63 mg/l air | 4 h | Rat (male) | Experimental value | |
| Inhalation (gases) | LC50 | Other | 1460 ppm | 4 h | Rat (male) | Experimental value | |

As the substance is a gas, inhalation is the most likely route of exposure

Conclusion

Harmful if swallowed.

Toxic if inhaled.

Not classified as acute toxic in contact with skin

Corrosion/irritation

Ethylene oxide >87% / Carbon dioxide

No (test) data on the mixture available

Classification is based on the relevant ingredients

The liquid form can cause frostbites, typical for all liquefied gases

ethylene oxide

| Route of exposure | Result | Method | Exposure time | Time point | Species | Value determination | Remark |
|-------------------|------------|------------------------|------------------------|--------------|---------|---------------------|------------------|
| Eye | Irritating | Equivalent to OECD 405 | | 24; 48 hours | Rabbit | Experimental value | Aqueous solution |
| Skin | Irritating | | 1 minutes - 60 minutes | | Rabbit | Experimental value | Aqueous solution |
| Inhalation | Irritating | | | | | Annex VI | |

Insufficient data available. Classification according to Regulation (EC) No 1272/2008 - Annex VI

The liquid form can cause frostbites, typical for all liquefied gases

Conclusion

Causes skin irritation.

Causes serious eye irritation.

May cause respiratory irritation.

Respiratory or skin sensitisation

Ethylene oxide >87% / Carbon dioxide

No (test) data on the mixture available

Judgement is based on the relevant ingredients

The study on skin sensitisation does not need to be conducted as the substance is a gas

ethylene oxide

| Route of exposure | Result | Method | Exposure time | Observation time point | Species | Value determination | Remark |
|-------------------|--------|--------|---------------|------------------------|---------|---------------------|--------|
| Skin | | | | | | Data waiving | |

The study on skin sensitisation does not need to be conducted as the substance is a gas

Conclusion

Not classified as sensitizing for skin

Not classified as sensitizing for inhalation

Specific target organ toxicity

Ethylene oxide >87% / Carbon dioxide

No (test) data on the mixture available

Classification is based on the relevant ingredients

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Ethylene oxide >87% / Carbon dioxide

As the substance is a gas, inhalation is the most likely route of exposure

ethylene oxide

| Route of exposure | Parameter | Method | Value | Organ | Effect | Exposure time | Species | Value determination |
|----------------------|-----------|--------------------------|--------|------------------------|-----------|---|---------------------|---------------------|
| Dermal | | | | | | | | Data waiving |
| Inhalation (vapours) | NOAEC | Equivalent to OECD 453 | 10 ppm | Central nervous system | No effect | 104 weeks (6h/day, 5 days/week) | Rat (male/female) | Experimental value |
| Inhalation (vapours) | NOAEC | Subchronic toxicity test | 10 ppm | | No effect | 10 weeks (6h/day, 5 days/week) - 11 weeks (6h/day, 5 days/week) | Mouse (male/female) | Experimental value |

As the substance is a gas, inhalation is the most likely route of exposure

Conclusion

Causes damage to organs (central nervous system) through prolonged or repeated exposure.

Mutagenicity (in vitro)

Ethylene oxide >87% / Carbon dioxide

No (test)data on the mixture available

ethylene oxide

| Result | Method | Test substrate | Effect | Value determination |
|---------------------------------------|------------------------|--|--------|---------------------|
| Positive without metabolic activation | Equivalent to OECD 471 | Bacteria (S.typhimurium) | | Experimental value |
| Positive without metabolic activation | Equivalent to OECD 476 | Chinese hamster lung fibroblasts (V79) | | Experimental value |

Mutagenicity (in vivo)

Ethylene oxide >87% / Carbon dioxide

No (test)data on the mixture available

Classification is based on the relevant ingredients

ethylene oxide

| Result | Method | Exposure time | Test substrate | Organ | Value determination |
|----------|--------|---------------|-------------------|-------|---------------------|
| Positive | Other | 4 h | Rat (male/female) | | Experimental value |

Conclusion

May cause genetic defects.

Carcinogenicity

Ethylene oxide >87% / Carbon dioxide

No (test)data on the mixture available

Classification is based on the relevant ingredients

ethylene oxide

| Route of exposure | Parameter | Method | Value | Exposure time | Species | Effect | Organ | Value determination |
|----------------------|-----------|------------------------|--------|---------------------------------|-------------------|-----------------------|-------|---------------------|
| Inhalation (vapours) | NOAEC | Equivalent to OECD 453 | 10 ppm | 104 weeks (6h/day, 5 days/week) | Rat (male/female) | No neoplastic effects | | Experimental value |

Conclusion

May cause cancer.

Reproductive toxicity

Ethylene oxide >87% / Carbon dioxide

No (test)data on the mixture available

Judgement is based on the relevant ingredients

Ethylene oxide >87% / Carbon dioxide

ethylene oxide

| | Parameter | Method | Value | Exposure time | Species | Effect | Organ | Value determination |
|------------------------|-----------|------------------------|----------------|--|-------------------|-----------|-------|---------------------|
| Developmental toxicity | NOAEC | Equivalent to OECD 414 | 0.18 mg/l air | 6 days (gestation, daily) - 15 days (gestation, daily) | Rat (female) | No effect | | Experimental value |
| Maternal toxicity | NOAEC | Equivalent to OECD 414 | 0.18 mg/l air | 6 days (gestation, daily) - 15 days (gestation, daily) | Rat (female) | No effect | | Experimental value |
| Effects on fertility | NOAEC (P) | Equivalent to OECD 415 | 0.054 mg/l air | 14 weeks (6h/day, 5 days/week) | Rat (male/female) | No effect | | Experimental value |

Conclusion

Toxicity to reproduction is unlikely to be significant

Toxicity other effects

Ethylene oxide >87% / Carbon dioxide

No (test) data on the mixture available

Chronic effects from short and long-term exposure

Ethylene oxide >87% / Carbon dioxide

Dry skin. Red skin. Itching. Inflammation/damage of the eye tissue. Nausea. Vomiting. Headache. Impairment of the nervous system. Sensorial disturbances. Movement disturbances. Coordination disorders. Myasthenia. Change in the haemogramme/blood composition. Impairment of the blood forming system. Degeneration of heart tissue. Tumours of the gastrointestinal tract. Possible bladder tumours. Brain affection. Possible premature birth.

SECTION 12: Ecological information

12.1. Toxicity

Ethylene oxide >87% / Carbon dioxide

No (test) data on the mixture available

Judgement of the mixture is based on the relevant ingredients

ethylene oxide

| | Parameter | Method | Value | Duration | Species | Test design | Fresh/salt water | Value determination |
|---|-----------|------------------------|---------------------|-------------|---------------------------------|---------------|------------------|---------------------|
| Acute toxicity fishes | LC50 | EPA 660/3 - 75/009 | 84 mg/l | 96 h | Pimephales promelas | Static system | Fresh water | Experimental value |
| Acute toxicity crustacea | LC50 | EPA 600/3-75/009 | 137 mg/l - 300 mg/l | 48 h | Daphnia magna | Static system | Fresh water | Experimental value |
| Toxicity algae and other aquatic plants | EC50 | Equivalent to OECD 201 | 240 mg/l | 96 h | Pseudokirchneriella subcapitata | Static system | Fresh water | Experimental value |
| Toxicity aquatic micro-organisms | EC10 | OECD 209 | 130 mg/l | 180 minutes | | Static system | Fresh water | Experimental value |

carbon dioxide

| | Parameter | Method | Value | Duration | Species | Test design | Fresh/salt water | Value determination |
|-----------------------|-----------|--------|---------|----------|-----------------|-------------|------------------|--------------------------|
| Acute toxicity fishes | LC50 | | 35 mg/l | 96 h | Salmo gairdneri | | | Literature study; Lethal |

Conclusion

Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008

12.2. Persistence and degradability

Ethylene oxide >87% / Carbon dioxide

Half-life soil (t1/2 soil)

| Method | Value | Primary degradation/mineralisation | Value determination |
|--------|-------|------------------------------------|----------------------|
| | | | Not applicable (gas) |

Ethylene oxide >87% / Carbon dioxide

ethylene oxide

Biodegradation water

| Method | Value | Duration | Value determination |
|-----------------------------------|-------------|-----------|---------------------|
| OECD 301C: Modified MITI Test (I) | 93 % - 98 % | 28 day(s) | Read-across |
| OECD 301D: Closed Bottle Test | 69 % | 20 day(s) | Experimental value |

Phototransformation air (DT50 air)

| Method | Value | Conc. OH-radicals | Value determination |
|---------------|-------------|-------------------------|---------------------|
| SRC AOP v1.92 | 57.2 day(s) | 500000 /cm ³ | QSAR |

Half-life soil (t1/2 soil)

| Method | Value | Primary degradation/mineralisation | Value determination |
|--------|----------------|------------------------------------|---------------------|
| | Not applicable | | |

carbon dioxide

Half-life soil (t1/2 soil)

| Method | Value | Primary degradation/mineralisation | Value determination |
|--------|----------------|------------------------------------|---------------------|
| | Not applicable | | |

Conclusion

Does not contain any not readily biodegradable component(s)

12.3. Bioaccumulative potential

Ethylene oxide >87% / Carbon dioxide

Log Kow

| Method | Remark | Value | Temperature | Value determination |
|--------|--------------------------|-------|-------------|---------------------|
| | Not applicable (mixture) | | | |

ethylene oxide

Log Kow

| Method | Remark | Value | Temperature | Value determination |
|--------|--------|-------|-------------|---------------------|
| | | -0.3 | 25 °C | |

carbon dioxide

Log Kow

| Method | Remark | Value | Temperature | Value determination |
|--------|--------|-------|-------------|---------------------|
| | | 0.83 | | Experimental value |

Conclusion

Does not contain bioaccumulative component(s)

12.4. Mobility in soil

ethylene oxide

(log) Koc

| Parameter | Method | Value | Value determination |
|-----------|--------------------|-------|---------------------|
| log Koc | SRC PCKOCWIN v1.66 | 0.157 | QSAR |

Volatility (Henry's Law constant H)

| Value | Method | Temperature | Remark | Value determination |
|-------------------------------|--------------------|-------------|--------|---------------------|
| 12.159 Pa.m ³ /mol | SRC HENRYWIN v3.10 | 25 °C | | QSAR |

Percent distribution

| Method | Fraction air | Fraction biota | Fraction sediment | Fraction soil | Fraction water | Value determination |
|----------------|--------------|----------------|-------------------|---------------|----------------|---------------------|
| Mackay level I | 7.75 % | | 0 % | 0 % | 92.23 % | QSAR |

carbon dioxide

Volatility (Henry's Law constant H)

| Value | Method | Temperature | Remark | Value determination |
|--------------------------------|--------|-------------|--------|---------------------|
| 0.0152 atm m ³ /mol | | 25 °C | | Estimated value |

Conclusion

No (test)data on mobility of the components available

12.5. Results of PBT and vPvB assessment

Does not contain component(s) that meet(s) the criteria of PBT and/or vPvB as listed in Annex XIII of Regulation (EC) No 1907/2006.

12.6. Other adverse effects

Ethylene oxide >87% / Carbon dioxide

Fluorinated greenhouse gases (Regulation (EU) No 517/2014)

None of the known components is included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014)

Contains component(s) included in the list of substances which may contribute to the greenhouse effect (IPCC)

Ozone-depleting potential (ODP)

Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009)

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Ethylene oxide >87% / Carbon dioxide

carbon dioxide

Fluorinated greenhouse gases (Regulation (EU) No 517/2014)

Included in the list of substances which may contribute to the greenhouse effect (IPCC)

SECTION 13: Disposal considerations

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

13.1. Waste treatment methods

13.1.1 Provisions relating to waste

European Union

Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

Waste material code (Directive 2008/98/EC, Decision 2000/0532/EC).

16 05 04* (gases in pressure containers and discarded chemicals: gases in pressure containers (including halons) containing hazardous substances).

Depending on branch of industry and production process, also other waste codes may be applicable.

13.1.2 Disposal methods

Refer to manufacturer/supplier for information on recovery/ recycling. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Do not discharge into drains or the environment.

13.1.3 Packaging/Container

European Union

Waste material code packaging (Directive 2008/98/EC).

15 01 10* (packaging containing residues of or contaminated by dangerous substances).

SECTION 14: Transport information

Road (ADR)

14.1. UN number

| | |
|-----------|------|
| UN number | 3300 |
|-----------|------|

14.2. UN proper shipping name

| | |
|----------------------|---|
| Proper shipping name | Ethylene oxide and carbon dioxide mixture |
|----------------------|---|

14.3. Transport hazard class(es)

| | |
|------------------------------|-----|
| Hazard identification number | 263 |
| Class | 2 |
| Classification code | 2TF |

14.4. Packing group

| | |
|---------------|---------|
| Packing group | |
| Labels | 2.3+2.1 |

14.5. Environmental hazards

| | |
|--|----|
| Environmentally hazardous substance mark | no |
|--|----|

14.6. Special precautions for user

| | |
|--------------------|-------|
| Special provisions | |
| Limited quantities | none. |

Rail (RID)

14.1. UN number

| | |
|-----------|------|
| UN number | 3300 |
|-----------|------|

14.2. UN proper shipping name

| | |
|----------------------|---|
| Proper shipping name | Ethylene oxide and carbon dioxide mixture |
|----------------------|---|

14.3. Transport hazard class(es)

| | |
|------------------------------|-----|
| Hazard identification number | 263 |
| Class | 2 |
| Classification code | 2TF |

14.4. Packing group

| | |
|---------------|---------------|
| Packing group | |
| Labels | 2.3+2.1 (+13) |

14.5. Environmental hazards

| | |
|--|----|
| Environmentally hazardous substance mark | no |
|--|----|

14.6. Special precautions for user

| | |
|--------------------|-------|
| Special provisions | |
| Limited quantities | none. |

Inland waterways (ADN)

14.1. UN number

| | |
|-----------|------|
| UN number | 3300 |
|-----------|------|

14.2. UN proper shipping name

| | |
|----------------------|---|
| Proper shipping name | Ethylene oxide and carbon dioxide mixture |
|----------------------|---|

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Ethylene oxide >87% / Carbon dioxide

14.3. Transport hazard class(es)

| | |
|---------------------|-----|
| Class | 2 |
| Classification code | 2TF |

14.4. Packing group

| | |
|---------------|---------|
| Packing group | |
| Labels | 2.3+2.1 |

14.5. Environmental hazards

| | |
|--|----|
| Environmentally hazardous substance mark | no |
|--|----|

14.6. Special precautions for user

| | |
|--------------------|-------|
| Special provisions | |
| Limited quantities | none. |

Sea (IMDG/IMSBC)

14.1. UN number

| | |
|-----------|------|
| UN number | 3300 |
|-----------|------|

14.2. UN proper shipping name

| | |
|----------------------|---|
| Proper shipping name | ethylene oxide and carbon dioxide mixture |
|----------------------|---|

14.3. Transport hazard class(es)

| | |
|-------|-----|
| Class | 2.3 |
|-------|-----|

14.4. Packing group

| | |
|---------------|-----------|
| Packing group | |
| Labels | 2.3 + 2.1 |

14.5. Environmental hazards

| | |
|--|----|
| Marine pollutant | - |
| Environmentally hazardous substance mark | no |

14.6. Special precautions for user

| | |
|--------------------|-------|
| Special provisions | |
| Limited quantities | none. |

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

| | |
|--------------------------|----------------|
| Annex II of MARPOL 73/78 | Not applicable |
|--------------------------|----------------|

Air (ICAO-TI/IATA-DGR)

14.1. UN number

| | |
|-----------|-----------|
| Transport | Forbidden |
| UN number | 3300 |

14.2. UN proper shipping name

| | |
|----------------------|---|
| Proper shipping name | Ethylene oxide and carbon dioxide mixture |
|----------------------|---|

14.3. Transport hazard class(es)

| | |
|-------|-----|
| Class | 2.3 |
|-------|-----|

14.4. Packing group

| | |
|---------------|--|
| Packing group | |
| Labels | |

14.5. Environmental hazards

| | |
|--|----|
| Environmentally hazardous substance mark | no |
|--|----|

14.6. Special precautions for user

| | |
|--|----|
| Special provisions | A2 |
| Limited quantities: maximum net quantity per packaging | |

SECTION 15: Regulatory information

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

European legislation:

VOC content Directive 2010/75/EU

| VOC content | Remark |
|-------------|--------|
| > 87 % | |

REACH Annex XVII - Restriction

Contains component(s) subject to restrictions of Annex XVII of Regulation (EC) No 1907/2006: restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.

| | Designation of the substance, of the group of substances or of the mixture | Conditions of restriction |
|----------------|---|---|
| ethylene oxide | Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as carcinogen category 1A or 1B (Table 3.1) or carcinogen category 1 or 2 (Table 3.2) and listed as follows: - Carcinogen category 1A (Table 3.1)/carcinogen category 1 (Table 3.2) listed in Appendix 1 - Carcinogen category 1B (Table 3.1)/carcinogen category 2 (Table 3.2) listed in Appendix 2 | Without prejudice to the other parts of this Annex the following shall apply to entries 28 to 30:1. Shall not be placed on the market, or used, — as substances, — as constituents of other substances, or, — in mixtures, for supply to the general public when the individual concentration in the substance or mixture is equal to or greater than: — either the relevant specific concentration limit specified in Part 3 of Annex VI to Regulation (EC) No 1272/2008, or, |

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Ethylene oxide >87% / Carbon dioxide

| | | |
|----------------|--|--|
| | | <p>— the relevant concentration specified in Directive 1999/45/EC where no specific concentration limit is set out in Part 3 of Annex VI to Regulation (EC) No 1272/2008. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of such substances and mixtures is marked visibly, legibly and indelibly as follows: “Restricted to professional users”.2. By way of derogation, paragraph 1 shall not apply to:</p> <p>(a) medicinal or veterinary products as defined by Directive 2001/82/EC and Directive 2001/83/EC;</p> <p>(b) cosmetic products as defined by Directive 76/768/EEC;</p> <p>(c) the following fuels and oil products:</p> <p>— motor fuels which are covered by Directive 98/70/EC,</p> <p>— mineral oil products intended for use as fuel in mobile or fixed combustion plants,</p> <p>— fuels sold in closed systems (e.g. liquid gas bottles);</p> <p>(d) artists’ paints covered by Directive 1999/45/EC;</p> <p>(e) the substances listed in Appendix 11, column 1, for the applications or uses listed in Appendix 11, column 2. Where a date is specified in column 2 of Appendix 11, the derogation shall apply until the said date.</p> |
| ethylene oxide | Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as germ cell mutagen category 1A or 1B (Table 3.1) or mutagen category 1 or 2 (Table 3.2) and listed as follows: - Mutagen category 1A (Table 3.1)/mutagen category 1 (Table 3.2) listed in Appendix 3 - Mutagen category 1B (Table 3.1) /mutagen category 2 (Table 3.2) listed in Appendix 4 | <p>Without prejudice to the other parts of this Annex the following shall apply to entries 28 to 30:1. Shall not be placed on the market, or used,</p> <p>— as substances,</p> <p>— as constituents of other substances, or,</p> <p>— in mixtures,</p> <p>for supply to the general public when the individual concentration in the substance or mixture is equal to or greater than:</p> <p>— either the relevant specific concentration limit specified in Part 3 of Annex VI to Regulation (EC) No 1272/2008, or,</p> <p>— the relevant concentration specified in Directive 1999/45/EC where no specific concentration limit is set out in Part 3 of Annex VI to Regulation (EC) No 1272/2008. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of such substances and mixtures is marked visibly, legibly and indelibly as follows: “Restricted to professional users”.2. By way of derogation, paragraph 1 shall not apply to:</p> <p>(a) medicinal or veterinary products as defined by Directive 2001/82/EC and Directive 2001/83/EC;</p> <p>(b) cosmetic products as defined by Directive 76/768/EEC;</p> <p>(c) the following fuels and oil products:</p> <p>— motor fuels which are covered by Directive 98/70/EC,</p> <p>— mineral oil products intended for use as fuel in mobile or fixed combustion plants,</p> <p>— fuels sold in closed systems (e.g. liquid gas bottles);</p> <p>(d) artists’ paints covered by Directive 1999/45/EC;</p> <p>(e) the substances listed in Appendix 11, column 1, for the applications or uses listed in Appendix 11, column 2. Where a date is specified in column 2 of Appendix 11, the derogation shall apply until the said date.</p> |
| ethylene oxide | Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to that Regulation or not. | <p>1. Shall not be used, as substance or as mixtures in aerosol dispensers where these aerosol dispensers are intended for supply to the general public for entertainment and decorative purposes such as the following:</p> <p>— metallic glitter intended mainly for decoration,</p> <p>— artificial snow and frost,</p> <p>— “whoopie” cushions,</p> <p>— silly string aerosols,</p> <p>— imitation excrement,</p> <p>— horns for parties,</p> <p>— decorative flakes and foams,</p> <p>— artificial cobwebs,</p> <p>— stink bombs.2. Without prejudice to the application of other Community provisions on the classification, packaging and labelling of substances, suppliers shall ensure before the placing on the market that the packaging of aerosol dispensers referred to above is marked visibly, legibly and indelibly with:</p> <p>“For professional users only”.3. By way of derogation, paragraphs 1 and 2 shall not apply to the aerosol dispensers referred to Article 8 (1a) of Council Directive 75/ 324/EEC.4. The aerosol dispensers referred to in paragraphs 1 and 2 shall not be placed on the market unless they conform to the requirements indicated.</p> |

National legislation Belgium

Ethylene oxide >87% / Carbon dioxide

No data available

ethylene oxide

| | |
|---------------------------|---|
| Additional classification | Oxyde d'éthylène; C; La mention "C" signifie que l'agent en question relève du champ d'application de l'arrêté royal du 2 décembre 1993 concernant la protection des travailleurs contre les risques liés à l'exposition à des agents cancérigènes et mutagènes au travail. |
|---------------------------|---|

National legislation The Netherlands

Ethylene oxide >87% / Carbon dioxide

| | |
|---------------------|-------|
| Waterbevaarlijkheid | Z (2) |
|---------------------|-------|

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Ethylene oxide >87% / Carbon dioxide

ethylene oxide

| | |
|--|--|
| SZW - Lijst van kankerverwekkende stoffen | Ethyleenoxide; Listed in SZW-list of carcinogenic substances |
| SZW - Lijst van mutagene stoffen | Ethyleenoxide; Listed in SZW-list of mutagenic substances |
| SZW - Lijst van voor de voortplanting giftige stoffen (vruchtbaarheid) | Ethyleenoxide; 1B; May damage fertility. |

National legislation France

Ethylene oxide >87% / Carbon dioxide

No data available

ethylene oxide

| | |
|-----------------------|-----------------------|
| Catégorie cancérogène | Oxyde d'éthylène; C1B |
| Catégorie mutagène | Oxyde d'éthylène; M1B |

National legislation Germany

Ethylene oxide >87% / Carbon dioxide

| | |
|-----|---|
| WGK | 2; Classification water polluting based on the components in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 27 July 2005 (Anhang 4) |
|-----|---|

ethylene oxide

| | |
|---------|---------------|
| TA-Luft | 5.2.7.1.1; II |
|---------|---------------|

National legislation United Kingdom

Ethylene oxide >87% / Carbon dioxide

No data available

ethylene oxide

| | |
|------------|----------------------|
| Carcinogen | Ethylene oxide; Carc |
|------------|----------------------|

Other relevant data

Ethylene oxide >87% / Carbon dioxide

No data available

ethylene oxide

| | |
|-----------------------|--------------------|
| IARC - classification | 1; Ethylene oxide |
| TLV - Carcinogen | Ethylene oxide; A2 |

15.2. Chemical safety assessment

No chemical safety assessment has been conducted for the mixture.

ethylene oxide

A chemical safety assessment has been performed.

SECTION 16: Other information

Full text of any H-statements referred to under headings 2 and 3:

- 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 (central nervous system) through prolonged or repeated exposure.

| | |
|--------------|--|
| (*) | INTERNAL CLASSIFICATION BY BIG |
| CLP (EU-GHS) | Classification, labelling and packaging (Globally Harmonised System in Europe) |
| DMEL | Derived Minimal Effect Level |
| DNEL | Derived No Effect Level |
| EC50 | Effect Concentration 50 % |
| ErC50 | EC50 in terms of reduction of growth rate |
| LC50 | Lethal Concentration 50 % |
| LD50 | Lethal Dose 50 % |
| NOAEL | No Observed Adverse Effect Level |
| NOEC | No Observed Effect Concentration |
| OECD | Organisation for Economic Co-operation and Development |
| PBT | Persistent, Bioaccumulative & Toxic |
| PNEC | Predicted No Effect Concentration |
| STP | Sludge Treatment Process |
| vPvB | very Persistent & very Bioaccumulative |

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Ethylene oxide >87% / Carbon dioxide

Specific concentration limits CLP

| | | | |
|----------------|----------|--------------------------|---------------------------------|
| ethylene oxide | C ≥ 30 % | Chem. Unst. Cat. A; H230 | UN Manual of Tests and Criteria |
|----------------|----------|--------------------------|---------------------------------|

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question. Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided and cannot be held liable for any changes by third parties. This safety data sheet is only to be used within the European Union, Switzerland, Iceland, Norway and Liechtenstein. Any use outside of this area is at your own risk. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement or when this is failing the general conditions of BIG. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult the mentioned agreement/conditions for details.

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