

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

1.1. Product identifier

Trade name : Ethylene
 Product code : P013, P013T

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

Use of the substance/mixture : Polyethylenes (sacks and bags, for packing yoghurt and agriculture films), Ethylene Oxide (yarn and polyester fibers, PET Resin, Cosmetics), Vinyls (PVC: Pipes and fittings, PVC Toys VAM: Paint PVA), Styrenics (PS: disposable; PS: appliances; EPS: Styrofoam)

1.3. Details of the supplier of the safety data sheet

US office:
 Braskem S.A.
 5100 Westheimer Rd - Suite 495
 Houston, 77056 - USA

Manufacturer:
 Braskem S.A.
 Rua Eteno, 1561, Polo Petroquímico de Camaçari
 Camaçari, BA, CEP: 42810-000, Brasil

Braskem S.A.
 BR 386 – Rodovia Tabai-Canoas, km 419, Via do Contorno, 850
 Triunfo, RS, CEP: 95853-000, Brasil

Braskem S.A.
 Av. Presidente Costa e Silva, 1178 – Capuava
 Santo André, SP, CEP: 09270-001, Brasil

Braskem S.A.
 Rua Marumbi, 1001
 Duque de Caxias, RJ, CEP: 25221-000, Brasil

Contact Email : productsafety@braskem.com
 Emergency Telephone Number (CHEMTREC) : 1-800-424-9300

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Gas 1 H220
 Compressed gas H280
 STOT SE 3 H336
 STOT SE 3 H335

Full text of H-statements: see section 16

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H220 - Extremely flammable gas
 H280 - Contains gas under pressure; may explode if heated
 H335 - May cause respiratory irritation
 H336 - May cause drowsiness or dizziness

Precautionary statements (GHS-US) : P210 - Keep away from heat, sparks, open flames, hot surfaces, No smoking. - No smoking
 P261 - Avoid breathing gas, vapours, fume, mist, spray, dust

P271 - Use only outdoors or in a well-ventilated area
 P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
 P312 - Call a poison center/doctor/... if you feel unwell
 P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
 P381 - Eliminate all ignition sources if safe to do so
 P403 - Store in a well-ventilated place
 P403+P233 - Store in a well-ventilated place. Keep container tightly closed
 P405 - Store locked up
 P410+P403 - Protect from sunlight. Store in a well-ventilated place
 P501 - Dispose of contents/container to comply with applicable local, national and international regulation.

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Name : Ethylene

CAS No : 74-85-1

Name	Product identifier	%	GHS-US classification
ethylene	(CAS No) 74-85-1	99	Flam. Gas 1, H220 Compressed gas, H280 STOT SE 3, H336 STOT SE 3, H335

Full text of H-statements: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures

First-aid measures after inhalation : Remove casualty to fresh air and keep warm and at rest. In case of irregular breathing or respiratory arrest provide artificial respiration. In case of breathing difficulties administer oxygen. Immediately get medical attention.

First-aid measures after skin contact : Remove contaminated clothing and shoes. Rinse immediately with plenty of water (for at least 15 minutes). Seek medical advice. Wash clothing before re-using. DO NOT attempt to remove the frozen clothing from the skin since removal could result in severe tissue damage. Clothing frozen to the skin should be thawed before being removed. Thaw frosted parts with lukewarm water. Do no rub affected area. Obtain medical attention.

First-aid measures after eye contact : Rinse immediately and plentifully with water, also under the eyelids, for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical advice.

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

Symptoms/injuries : Symptoms may include dizziness, headache, nausea and loss of coordination.

Symptoms/injuries after inhalation : Regular asphyxiating, high concentrations may dislocate oxygen and cause rising cardiac frequency and respiratory flux, abnormal fatigue, nausea, vomiting, conscience loss, convulsion, respiratory collapse and death depending of the exposure grade. May cause drowsiness or dizziness.

Symptoms/injuries after skin contact : Can cause frostbite. The skin may present itself with white or yellow tone with waxy aspect.

Symptoms/injuries after eye contact : Can cause frostbite.

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

Treat symptomatically. No direct artificial respiration to be given by first aider. Do not rub the skin and eyes after direct contact with the product. Symptomatic treatment should include, above all, measures of support as correction of hydro electrolytic and metabolic disturbances and respiratory failure.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : carbon dioxide (CO₂), dry chemical powder, foam. Water fog.

Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Highly flammable. This material can accumulate static charge by flow or agitation and can be ignited by static discharge.
- Explosion hazard : Risk of explosion if heated under confinement.

5.3. Advice for firefighters

- Firefighting instructions : Cool closed containers exposed to fire with water spray.
- Protective equipment for firefighters : Extra personal protection: complete protective clothing including self-contained breathing apparatus. Refer to section 8.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

- Protective equipment : Wear suitable protective clothing gloves, and eye/face protection. Refer to section 8.
- Emergency procedures : Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Evacuate unnecessary personnel.

6.1.2. For emergency responders

- Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. Refer to section 8.
- Emergency procedures : Eliminate every possible source of ignition.

6.2. Environmental precautions

Avoid release to the environment. Avoid sub-soil penetration.

6.3. Methods and material for containment and cleaning up

- For containment : Ventilate affected area. Cut off gas supply.
- Methods for cleaning up : Ventilate affected area. May be vented to atmosphere.

6.4. Reference to other sections

Refer to sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Avoid contact with skin and eyes. Avoid inhalation of product. . Use grounded electrical/mechanical equipment. Ground/bond container and receiving equipment. keep equipment available for fire fighting and containment of spills or leaks.

7.2. Conditions for safe storage, including any incompatibilities

- Storage conditions : Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep stored the least quantity possible. Store in dry, cool, well-ventilated area. Keep the cylinders at vertical position, fixed to the wall or other solid structure. Ensure cylinder valve is closed and not leaking. Do not store in underground level.
- Incompatible materials : Strong oxidizing agents (like fluorite, perchlorates, chlorine dioxide, nitrates, permanganates and peroxides). Strong acid (like hydrobromic, nitric, sulphuric and hydrochloridric acids). Halocarbonates (like brominetrichlorometane, carbon tetrachloride, chlorotrifluoroethylene and tetrafluoroethylene). Chlorine (Cl₂). Nitrogen oxides. Copper. Aluminium chloride. Ozone.
- Packaging materials : Carbon steel or stainless steel cylinders.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ethylene (74-85-1)		
ACGIH	ACGIH TWA (ppm)	200 ppm

8.2. Exposure controls

- Appropriate engineering controls : Provide local exhaust or general room ventilation to minimize vapour concentrations. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Personal protective equipment : Protective goggles. Protective clothing. Gloves. Gas mask.



Hand protection : Protective gloves made of PVC.
 Eye protection : safety goggles. Do not wear contact lenses.
 Skin and body protection : Wear suitable protective clothing.
 Respiratory protection : Filtering respiratory protective device with a specific gas canister.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas
 Colour : Colourless
 Odour : Sweet
 Odour threshold : No data available
 pH : No data available
 Relative evaporation rate (butyl acetate=1) : No data available
 Melting point : -169.4 °C
 Freezing point : No data available
 Boiling point : - 103,7 oC (a 1 atm); - 14,2 oC (a 30 atm).
 Flash point : ≈ -136 (Closed cup)
 Auto-ignition temperature : 490 °C (in air at 1 atmosphere). It is reported in literature values that range from 425 to 543°C
 Decomposition temperature : 9.6 °C
 Flammability (solid, gas) : No data available
 Vapour pressure : 4100 kPa (30753 mm Hg)
 Relative vapour density : 0.98 at 0 °C (air=1)
 Relative density : Liquid: 0,57 (130,8°C)
 Gas: 0,00126 a 0°C (água = 1)
 Density : 0.57 Specific gravity (liquid) at -130.8 °C
 Solubility : Water: Slightly soluble. Soluble in acetone, benzene, dithyl ether, ethylene oxide. Slight solubility in ethanol.
 Log Pow : 1.13
 Log Kow : No data available
 Viscosity, kinematic : 0,01 cP (0,01 mPa. s) @ 0 °C for gas and 0,16 cP (0,16 mPa. s) for liquid
 Viscosity, dynamic : No data available
 Explosive properties : No data available
 Oxidising properties : No data available
 Explosive limits : No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

Polymerize at high pressures (60 – 350mPa) and temperatures (above 350°C) on presence of high energy initiators, like heating or electricity. Strong oxidizing agents (like fluorite, perchlorates, chlorine dioxide, nitrates, permanganates and peroxides): may react violently and rises fire and explosion risk. Strong acid (like hydrobromic, nitric, sulphuric and hydrochloridric acids): may react violently or vigorously, with fire and explosion risk. Halocarbonates (like brominetrichlorometane, carbon tetrachloride, chlorotrifluoroethylene and tetrafluoroethylene): may explode violently. Chlorine: reacts explosively in presence of solar or ultraviolet light, or in presence of mercury oxides or silver oxide. Aluminum chloride: may react violently or explosively, specially in presence of dichloromethane, nickel catalizer or nitromethane. Nitrogen oxides an ozone: forms extremely unstable compound,

that may explode. Copper: ethylene polymerization may become violent at high pressures and temperatures. Molecular screen (like zeolites) with 5Å pore: may occur exothermic and violent reactions. Lithium: may occur explosive reaction. Hydrogen: may occur explosive hydrogenation reaction when heated.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Avoid static electricity discharges.

10.5. Incompatible materials

Strong oxidizing agents (like fluoride, perchlorates, chlorine dioxide, nitrates, permanganates and peroxides). Strong acid (like hydrobromic, nitric, sulphuric and hydrochloric acids).

10.6. Hazardous decomposition products

explosive decomposition in high temperatures (360°C) and pressures (17mPa), in absence of air may occur.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Ethylene (f)74-85-1	
LC50 inhalation rat (ppm)	> 57000 ppm/4h

Skin corrosion/irritation : Not classified (Based on the available data, the classification is not met)
 Serious eye damage/irritation : Not classified (Based on the available data, the classification is not met)
 Respiratory or skin sensitisation : Not classified (Based on the available data, the classification is not met)
 Germ cell mutagenicity : Not classified (Based on the available data, the classification is not met)
 Carcinogenicity : Not classified (Based on the available data, the classification is not met)

Reproductive toxicity : Not classified (Based on the available data, the classification is not met)
 Specific target organ toxicity (single exposure) : May cause drowsiness or dizziness. May cause respiratory irritation.

Specific target organ toxicity (repeated exposure) : Not classified (Based on the available data, the classification is not met)

Ethylene (74-85-1)	
LOAEL (inhalation, rat, gas, 90 days)	300 ppmv/6h/day
NOAEL (inhalation, rat, gas, 90 days)	10000 ppmv/6h/day

Aspiration hazard : Not classified
 Symptoms/injuries after inhalation : Regular asphyxiating, high concentrations may dislocate oxygen and cause rising cardiac frequency and respiratory flux, abnormal fatigue, nausea, vomiting, conscience loss, convulsion, respiratory collapse and death depending of the exposure grade. May cause drowsiness or dizziness.
 Symptoms/injuries after skin contact : Can cause frostbite. The skin may present itself with white or yellow tone with waxy aspect.
 Symptoms/injuries after eye contact : Can cause frostbite.

SECTION 12: Ecological information

12.1. Toxicity

Ethylene (74-85-1)	
ErC50 (algae)	30.327 mg/l Data obtained by analogy conclusion, e.g. QSAR.
NOEC (acute)	13.9 mg/l

12.2. Persistence and degradability

Ethylene (74-85-1)	
Persistence and degradability	Readily biodegradable. not persistent.

12.3. Bioaccumulative potential

Ethylene (74-85-1)	
BCF fish 1	> 2000
Log Pow	1.13

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on ozone layer : No additional information available

Effect on the global warming : No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Dispose of contents/container to comply with applicable local, national and international regulations. Consult the appropriate authorities about waste disposal.

Waste disposal recommendations : Dispose of this material and its container at hazardous or special waste collection point.

SECTION 14: Transport information

Classification for LAND transport: DOT

UN Number : UN1038
 Proper Shipping Name : Ethylene, refrigerated liquid
 Class / Division : 2.1 – Flammable gas
 Packing group : Not applicable
 Reportable quantity : Not applicable

Classification for SEA transport: IMO - IMDG

UN Number : UN1038
 Proper Shipping Name : ETHYLENE, REFRIGERATED LIQUID
 Class / Division : 2.1
 Packing group : Not applicable
 Environmental hazards : Not considered marine pollutant based on available data

Transport in bulk according to Annex II of MARPOL 73/78 and the IGC Code:

Product name : Ethylene

Classification for AIR transport: IATA - ICAO

UN Number : UN1038
 Proper Shipping Name : Ethylene, refrigerated liquid
 Class / Division : 2.1
 Packing group : Not applicable
 Environmental hazards : Formation of photochemical smog (air pollution especially in urban areas)
 Other information : Transport forbidden in passenger and cargo aircraft

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product and it should not be considered exhaustive. Consult US DOT, IMDG and IATA regulations before transporting the product. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: Regulatory information

15.1. US Federal regulations

No additional information available

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

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

No additional information available

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

No additional information available

15.2.2. National regulations

Ethylene (74-85-1)

No data available

15.3. US State regulations

No additional information available

SECTION 16: Other information

Sources of Key data : SDS - Safety Data Sheet.

Abbreviations and acronyms : ACGIH (American Conference of Government Industrial Hygienists). ASTM - American Society for Testing and Materials . CAS (Chemical Abstracts Service) number. CLP - Classification, Labelling and Packaging. EEC - European Economic Community. EC - European Community. CSR - Chemical Safety Report. GHS - Globally Harmonised System. IARC (International Agency for Research on Cancer). Overland transport (ADR). PVC (Polyvinyl chloride). REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals. SDS - Safety Data Sheet.

Full text of H-statements:

-----	Compressed gas	Gases under pressure : Compressed gas
-----	Flam. Gas 1	Flammable gases, Category 1
-----	STOT SE 3	Specific target organ toxicity (single exposure) Category 3
-----	STOT SE 3	Specific target organ toxicity (single exposure) Category 3
-----	H220	Extremely flammable gas
-----	H280	Contains gas under pressure; may explode if heated
-----	H335	May cause respiratory irritation
-----	H336	May cause drowsiness or dizziness

Braskem - SDS US

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. It warns that the handling of any chemical substance requires the previous knowledge of its hazards for the user. It is up to the user of the product company providing this SDS to and promote the training of its employees about possible risks come upon of the product. The information contained herein is not absolute, but only general information on the use of the chemical and indication of safety and security measures.