1. Identification of the substance / preparation and of the company / undertaking

IDENTIFICATION OF THE SUBSTANCE

Trade name ETHYLENE

Origin :
QATAR PETROCHEMICAL COMPANY
DOHA - QATAR
P.O. Box 756

Emergency Contact For Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300 CCN724450
Outside USA and Canada: +1-703-741-5970 and
+1-703-527-3887 (collect calls accepted)

Chemical name ethylene

MATERIAL USE
monomer, Industrial applications : Polymerization, manufacture of Resins.
Petrochemical industry : Plastics

Other Ethylene is sold in two forms:
1) COMPRESSED ETHYLENE (distributed by pipeline) - UN number: 1962
2) REFRIGERATED LIQUID ETHYLENE (in tanks) - UN number: 1038

Qatar Petrochemical Company (QAPCO) Q.P.J.S.C.
MAIN OFFICE : P.O.Box 756, Doha, Qatar. Tel : (+974) 4033 8000, Fax : (+974) 4432 4700
PLANT : P.O.Box 50155, Mesaieed, Qatar. Tel : (+974) 4477 7111, Fax : (+974) 4477 1346
Website : www.qapco.com Email : info@qapco.com.qa
## 2. Hazards identification

<table>
<thead>
<tr>
<th>Dangerous substances</th>
<th>Ethylene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main hazards</td>
<td>Extremely flammable</td>
</tr>
<tr>
<td>Target organs</td>
<td>Respiratory system.</td>
</tr>
</tbody>
</table>

**Inhalation**
narcotic in case of inhalation of high concentration of vapour

**Ingestion**
Ingestion during handling is not likely.

**Skin**
Contact with rapidly expanding gas may cause burns or frostbite.

**Eye**
Contact with rapidly expanding gas may cause burns or frostbite.

**Adverse environmental effects**
Avoid losses to the environment whenever possible. (refer to point 12)

**Adverse physicochemical effects**
Spills or leaks may cause a high risk of fire and explosion. Flowing product can create electrostatic charge, resulting sparks may ignite or cause an explosion.

## 3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>chemical name</th>
<th>Ethylene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonym</td>
<td>Ethene</td>
</tr>
<tr>
<td>Chemical formula</td>
<td>C2H4</td>
</tr>
<tr>
<td>Concentration (%)</td>
<td>&gt; 99,9 percent by weight</td>
</tr>
<tr>
<td>CAS number</td>
<td>CAS: 74-85-1</td>
</tr>
<tr>
<td>EINECS or ELINCS number</td>
<td>EINECS: 200-815-3</td>
</tr>
<tr>
<td>Symbol(s)</td>
<td>F+</td>
</tr>
<tr>
<td>R Phrase(s)</td>
<td>12-67</td>
</tr>
</tbody>
</table>

**Impurities contributing to hazard**
Ethane and Methane maximum 1000 ppm

**R Phrase(s) used**
some of the components of this preparation are classified following the European directives and have risk phrases (R), but only their code are indicated in this rubric. you may find the full text of them in rubric 16.
4. First-aid measures

General instructions
Warning! Extremely flammable gas
IN CASE OF HEAVY OR PERSISTENT DISTURBANCES, CALL A DOCTOR OR SEEK MEDICAL ADVICE URGENTLY

Route of exposure

- Inhalation
  Remove the affected person to fresh air if necessary, give oxygen administer artificial respiration. Seek medical advice.

- Skin contact
  Take off immediately all contaminated clothing flush immediately with plenty of water.

- Eye contact
  Flush immediately with plenty of water.
  Get medical advice (ophthalmologist)

- Ingestion
  Seek specialist advice at hospital or medical centre

Protective equipment for first-aiders
If exposure is likely to exceed the occupational exposure limit, in a ventilated space, use approved respiratory protective equipment; in confined space, use an autonomous breathing apparatus.

5. Fire - fighting measures

Flammability of the product
Flammable

Auto-ignition temperature
425 to 543 without guarantee (refer to point 9)

Flash point (ASTM D 93) (°C)
-172 to -135

explosion limits (% vol)
upper: 32.000
Lower: 2.700

Technical measures
Stop all flow of gas before extinguishing fire. take precautionary measures against static discharge during blending and transfer operations.

Extinguishing media
Carbon dioxide (CO2), dry chemicals, foam.
6. Accidental release measures

refer to points 8 and 13

After spillage / leakage
Evacuate non-essential personnel.
Call the fire brigade immediately.
Avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks.
gaseous above -104 °C
on soil
The product evaporates into the atmosphere.
on water
The product evaporates into the atmosphere.

7. Handling and storage

HANDLING
Handle under adequate ventilation working has to be made only on cold, degassed and ventilated storage tanks. (risk of explosive atmosphere) never subject a cylinder to severe mechanical shock.

STOCKAGE
Use only containers, joints, pipes, etc...Made in a material suitable for use with either gaseous or liquefied hydrocarbons under pressure and at very low temperatures. Tanks should be grounded and provided with adequate pressure relief valve.
Store the cylinders outdoors and out of sunshine or other sources of radiation.
Keep in a well-ventilated place.
Keep away from sources of ignition - No smoking.
MATERIAL SAFETY DATA SHEET

According to Regulation (EC) no. 1907/2006

ETHYLENE

Product: ETHYLENE

Technical measures
Store away from heating source. Avoid static electricity build up with connection to earth.

Incompatible materials
avoid contact with strong oxidizing materials, air, O2, NOx, peroxides, halogens (Fluorine, Chlorine, Bromine, Iodine)

Suitable container
stainless steel, carbon steel

SPECIFIC USE(S)
no information available
referto point 8

8. Exposure controls / personal protection

Exposure controls

EXPOSURE LIMITS

ETHYLENE:
US (ACGIH-2009): TLV- 8h TWA: 200 ppm - 230 mg/m³
AU (2005): Asphyxiant
ACGIH A4 category: not classifiable as a human carcinogen.

EXPOSURE CONTROLS

Occupational exposure controls

Personal protection
local exhaust ventilation may be needed when working in a closed area

Respiratory protection
If exposure is likely to exceed the occupational exposure limit, use an autonomous breathing apparatus.
filter protections:
unauthorized

Skin and body protection
Cold-insulating gloves
Shower and eye fountain available.

Eye protection
Do not wear contact lenses in any work area.
goggles/spectacles

Other personal protection
where exposure is likely, protective clothing must be worn including gloves

Industrial health measures
Avoid producing or diffusing fumes, vapour or spray into the air.
(particularly during loading or unloading product)
Do not store near food products.
do not wipe hands with cloths or rags which have been used for Cleaning.

Environmental exposure controls: unregulated

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state at 20°C</td>
<td>gas (compressed gas)</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>ether</td>
</tr>
</tbody>
</table>

**GENERAL INFORMATION**

**Change in physical state at 1013 hPa**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point (°C)</td>
<td>-169</td>
</tr>
<tr>
<td>Initial boiling point (°C)</td>
<td>-103.7</td>
</tr>
<tr>
<td>Critical temperature (°C)</td>
<td>9.9 °C (Pressure = 5030 kPa)</td>
</tr>
<tr>
<td>Flash point (ASTM D 93) (°C)</td>
<td>-172 to -135</td>
</tr>
<tr>
<td>Decomposition point (°C)</td>
<td>700</td>
</tr>
<tr>
<td>Auto-ignition temperature (°C)</td>
<td>425 to 543</td>
</tr>
</tbody>
</table>

The values of auto-ignition temperature are given without Guarantee. Indeed, these values vary widely depending on the source of Information.

**Explosion limits (% vol)**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>32,000</td>
</tr>
<tr>
<td>Lower</td>
<td>2,700</td>
</tr>
</tbody>
</table>

**Vapour pressure at 20°C (hPa)**

<table>
<thead>
<tr>
<th>Pressure (hPa)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>44000</td>
<td></td>
</tr>
</tbody>
</table>
### Relative Vapour Density (air=1)
0.9 to 0.98

### Density, Mass (kg/m³)
- Compressed liquefied gas
  - 610 (T = 0°C)
  - 570 (T = -103°C)

### Behaviour with Water at 20°C
Insoluble

### Solubility in Water at 20°C (mg/l)
- 154 (T = 20°C)
- 200 (T = 10°C)

### Soluble in
- Hydrocarbons and organic solvents

### Log P n-Octanol / Water at 20°C
1.21

### pH Value (Concentrated Product)
Not applicable

### Viscosity (mm²/s)
Not applicable (gas)

### Molecular Weight (kg/kmol)
28

### Henry's Constant (kPa.m³/mol)
21

### Other Information
No information available

### 10. Stability and Reactivity

**Hazardous Reactions**
- Extremely flammable
  - In use, may form flammable / explosive vapour-air mixture.
  - Hazardous polymerization may occur.

**Conditions to Avoid**
- Avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks.

**Materials to Avoid**
- Avoid contact with strong oxidizing materials air, O₂, NOx peroxides halogens (Fluorine, Chlorine, Bromine, Iodine)

**Decomposition Products**
- Complete combustion, with an excess of oxygen forms: carbon dioxide (CO₂) and water vapour.
  - Partial combustion, forms also: carbon monoxide (CO), soot and...
cracked products: aldehydes, ketones

11. Toxicological information

ACUTE TOXICITY
Inhalation in case of inhalation of high concentration of vapour: headache, drowsiness, loss of consciousness, asphyxia

LOCAL EFFECT
Inhalation in case of inhalation of high concentration of vapour: lachrymation and Irritating to respiratory system.
Eye contact irritation of ocular mucous membrane

CHRONIC TOXICITY
Studies of prolonged inhalation in animals have not shown chronic toxic effects.
no observed effect maximum dose / concentration : 11,6 mg/l : (rat) - 3 month

SPECIFIC EFFECTS
no particular effect reported on man

Genotoxicity (According to available experimental data) : this product has been found to be non-genotoxic in in-vivo assays this product has been found to be non-genotoxic in in-vitro assays metabolites are genotoxic (ethylene oxide)

Carcinogenicity (According to available experimental data) : Absence of carcinogenic effects in animals

12. Ecological information

Information on ecological effects Avoid losses to the environment whenever possible.
MOBILITY
water / air The product evaporates into the atmosphere.
water Because of its high volatility, the product is unlikely to cause ground or water pollution.

PERSISTENCE AND DEGRADABILITY
Biodegradation not readily biodegradable
soil and sediments adsorption is low: log Koc = 2.7

air Product released into the atmosphere is expected to undergo degradation in the presence of sunlight.

half life 0.8 day(s)

bIOACcumulative potential potential bioaccumulation of the product in environment is very low: log Pow = 1.21

13. Disposal considerations

Waste disposal hazardous waste
Dispose in a safe manner in accordance with local/national regulations.
incineration
do not dispose off this product into the environment

Disposal of contaminated packaging Dispose in a safe manner in accordance with local/national regulations.
All commercial cylinders must be returned to the supplier.

14. Transport information

Road (ADR) / Rail (RID)
UN Number 1962
Proper shipping name ETHYLENE
Hazard identification number 23
Class 2
classification code
Packing Group
Label(s)
Code tunnel

Transport on the Rhine (ADNR)
Identification number
Class
classification code
Packing Group
Label(s)

Marine (IMO)
IMDG
UN Number
Class or division
Subsidiary risk
Packing group
IMDG-Label(s)
IMDG-Marine pollution
Air transport (ICAO / IATA)
UN (or ID) Number
Class or division
15. Regulatory information

Labeling and Classification EC
Classification according to directives 67/548/EEC and 1999/45/EC.
UK legislation: CHIP3 Chemicals (Hazard Information and Packaging for Supply) Regulations 2002

Symbol(s) EC
F+ : Extremely flammable

R Phrase(s)
R 12 : Extremely flammable.
R 67 : Vapours may cause drowsiness and dizziness

S Phrase(s)
(S 2 : Keep out of reach of children.)
S 9 : Keep container in a well-ventilated place.
S 16 : Keep away from sources of ignition - No smoking.
S 33 : Take precautionary measures against static discharges.
S 46 : If swallowed, seek medical advice immediately and show this container or label.

Other
refer to any national measures that may be relevant.

EINECS number
EINECS: 200-815-3

Annex I - number
Nr: 601-010-00-3

Germany
Wassergefährdungsklasse
NWG: non-hazardous to waters

Registration
listed on the United States TSCA (Toxic Substances Control Act) inventory - CAS: 74-85-1
listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)- EEC Directive 79/831, sixth Amendment of the directive 67/548 (dangerous substances).
listed on the Japanese ENCS (Existing & New Chemical Substances) inventory, nr: 2-12
listed on the Canadian DSL (Domestic Substances List) inventory.
listed on the AICS (the Australian Inventory of Chemical Substances).
listed on the Korean ECL (Existing Chemical List) inventory. no:
KE-13226
listed on the Filipino PICCS (Philippine Inventory of Chemicals and
Chemical Substances) inventory.
listed on the swiss (liste des toxiques IGS/ IGS Giftliste 2003-2004)
inventory : Toxic category : 5- no: G-1172 (Ethylene )
listed on the People's Republic of China register: CRC-SEPA
(Chemical Registration Center for Chinese State Environmental
Protection Administration)

16. Other information

Training advice
The use of this product requires specific training. The user must
receive all product information in order to handle the product
safely (personal protection equipment and best practice standards)

Recommended uses and restrictions
Restricted to professional users

R Phrase(s) used
R 12 : Extremely flammable.
R 67 : Vapours may cause drowsiness and dizziness


This information applies to the PRODUCT AS SUCH and conforming to specifications of QATAR
PETROCHEMICAL COMPANY.
In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear.
The information contained is based on our knowledge of the product, at the date of publishing and it is given
quite sincerely. However the revision of some data is in progress.

Users are advised of possible additional hazards when the product is used in applications for which it was not
Intended. This sheet shall only be used and reproduced for prevention and security purposes.
The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive.
It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product.

It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product. (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment.

*There is No CHANGE in the MSDS contents regarding to the previous version except Updates on Emergency Contact Details.