

GPS Safety Summary

This Product Safety Summary is intended to provide a brief overview of the information on the risk assessment results of the chemical product that we manufacture based on the chemical industry's Global Product Strategy (GPS) to the general public as a social responsibility of a company that manufacture chemical substances.

This summary is not intended to provide technical information including effects on human health and the environment and details of risk assessment. In addition, it is not intended to be prepared as a document to replace a Safety Data Sheet (SDS) or a risk assessment report like a Chemical Safety Report under the REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) (REACH CSR). Although the summary is prepared based on the laws, materials, information and data that are available at the present moment, it does not provide any assurances.

SUBSTANCE NAME

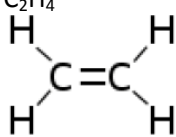
Ethylene (Ethylene, CAS No. 74-85-1)

GENERAL STATEMENT

Ethylene is a colorless gas with a slightly sweet odor. Ethylene is produced at Ethylene plant and is used as a raw material for a lot of manufacture of chemicals (ex. monomer for manufacture of polyethylene). Ethylene also acts as a plant hormone in regulation of plant growth and development. Ripening fruit release ethylene gas.

Ethylene is a extremely flammable gas, therefore it is important to keep away from heat, sparks, open flames or hot sources. Ethylene may cause drowsiness or dizziness if inhaled, it is recommended to wear appropriate protective masks, gloves when sampling for manufacturing. To minimize the adverse effects of Ethylene on environmental organisms and control its release into the environment, the sewage equipment should be monitored regularly and the sewage treatment facility should be maintained and inspected in the factory.

CHEMICAL IDENTITY

Item	Contents
Generic name	Ethylene, Ethene
Trade name	Ethylene
Chemical name	Ethylene (IUPAC name: Ethene)
CAS No.	74-85-1
Other numbers	Reference No. listed in the official gazettes (Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc., Industrial Safety and Health Act) (2)-12 EC No. 200-815-3
Molecular formula	C ₂ H ₄
Structural formula	

Other information None in particular

USES AND APPLICATIONS

Intended uses of our product As a raw material for compound (mainly polyethylene, ethylene oxide)

PHYSICAL/CHEMICAL PROPERTIES

Appearance (physical state)	Gas
Color	Colorless
Odor	Faint sweet fragrance
Specific gravity (relative density)	0.001
Melting point/boiling point	-169.4°C/-103.7°C(1013mba)
Combustibility/flammability	Extremely flammable gas (Category 1)
Flash point	-136°C
Limit of combustion or explosion	3 - 34 vol %(air)
Auto ignition temperature	490 °C
Vapor pressure	6666000 Pa(20°C)
Molecular weight	28.03
Water solubility	131 mg/L(25°C)
Octanol-water partition coefficient	LogKow : 1.13

HEALTH EFFECTS

Effect assessment	Results (GHS ^{*1} hazard classification)
Acute toxicity (oral ingestion)	Not applicable ^{*2}
Acute toxicity (inhalation)	Not classified ^{*3} (gas) Not applicable (vapor) Not applicable (dust/mist)
Acute toxicity (dermal)	Not applicable
Skin corrosion/irritation	Not classified
Serious eye damage/eye irritation	Not classified
Respiratory sensitization	Classification not possible ^{*4} (no toxicity report)
Skin sensitization	Classification not possible (no toxicity report)
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
Specific target organ toxicity (Single exposure)	May cause drowsiness or dizziness (narcotic effects, Category 3)
Specific target organ toxicity (Repeated exposure)	Not classified
Aspiration hazard	Not applicable
Source/remarks	

^{*1} GHS: Globally Harmonized System of Classification and Labelling of Chemicals. This system enables us to classify chemicals by hazard type and degree according to globally harmonized rules.

^{*2} Not applicable: Because the physical properties defined by GHS are not met, the chemical is not included in the target chemicals of the classification.

*³ Not classified: Hazardousness much lower than the lowest hazard class specified by GHS

*⁴ Classification not possible: The data needed for judging classification are not available at all or sufficient data are not collected for classification.

ENVIRONMENTAL EFFECTS

Effect assessment	Results (GHS hazard classification)
Hazardous to the aquatic environment (acute)	Harmful to aquatic life (Category 3)
Hazardous to the aquatic environment (chronic)	Not classified
Environmental fate/dynamics	Results
Transfer in the environment	None
Biodegradability	Though there is no report of biodegradability, Ethylene is considered to be decomposed quickly in the atmosphere.
Bioaccumulation	Low bioaccumulative potential
Conclusion of PBT/vPvB	Not judged to be PBT* and vPvB**.
	*PBT: Persistent, bioaccumulative and toxic (Remaining in the environment and having high bioaccumulative and strong toxic properties)
	**vPvB: very Persistent and very Bioaccumulative (Readily remaining in the environment and having very high bioaccumulative property)

EXPOSURE

Details	No.	Potential exposure in the process of use of our products (exposure route)
Occupational Exposure	1-1	Thorough sampling (inhalation, skin/eye contact). However Ethylene is produced in a closed process, potential for occupational exposure is extremely low.
Consumer exposure	2-1	This material is not used by consumers and therefore the potential for consumer exposure is extremely low.
Environmental exposure	3-1	Through sampling (mainly in the atmosphere) However Ethylene is manufactured in a closed system process, the possibility of environment release is very low. It is gas at normal temperature and normal pressure. In the case of environmental release, though it is considered to disperse into the atmosphere, it is expected to be degraded in the atmosphere rapidly.
Note		If there is a potential for exposure in other uses, take appropriate measures in reference to the risk management recommends.

RISK MANAGEMENT RECOMMENDATIONS

Details	No.	Management recommendations based on our risk assessment results
Occupational Exposure	1-1	Wear appropriate protective masks, clothing and gloves made of materials that ethylene does not penetrate during sampling operation. As the recommend threshold limit value, 200 ppm (TWA: time-weighted average) has been published by the ACGIH (American Conference of Governmental Industrial Hygienists). At the production site and other

		sites where propylene is used, manage and control its environmental concentration so that lower than this recommended value.
		The operation manager instructs workers how to select and use the appropriate protective equipment and how to manage the work place.
Consumer exposure	2-1	None
Environmental exposure	3-1	Ethylene may affect environment if leaked. Take measures to prevent leakage, and take due care in daily management and handling.
Other warnings		Extremely flammable. Keep away from ignition source such as heat/sparks/open flames/hot surfaces. Wear anti-static conductive shoes while handling this material. When facility of ethylene production are opened (e.g. periodical repair), its high concentration in the air may cause lack of oxygen. In some cases, measure oxygen concentration before entering the area, and wear appropriate personal protective equipment if required.
Note		For the measures and actions to be taken for regular handling, emergency situations, disposal and transportation, see Section 4, 5, 6, 7, 8, 13 and 14, SDS issued by Mitsubishi Chemical Corporation.

STATE AGENCY REVIEW

Assessment document	Review condition
International Safety Card	http://www.inchem.org/documents/icsc/icsc/eics0475.htm
OECD HPV	http://www.chem.unep.ch/irptc/sids/OECDSDS/74851.pdf
REACH	http://apps.echa.europa.eu/registered/registered-sub.aspx

REGULATORY INFORMATION / LABELLING INFORMATION

Main regulatory information

Law	Regulatory condition
UN class	2.1
UN No.	UN1962 " ETHYLENE" UN1038 " ETHYLENE, REFRIGERATED LIQUID"
High Pressure Gas Safety Act	Article 2 of the Security Regulation for General High Pressure Gas
Industrial Safety and Health Act	Enforcement Order, Appended Table 1, Dangerous Substances (5) Flammable gas
Ship Safety Act	Hazardous Substance List, Separate Table 1 High pressure gases - Flammable high pressure gases
Civil Aeronautics Act	Substances Approved for Transportation, 2. High pressure gases - 2.1 Flammable gases

Labelling information

Pictograms or symbols



Signal Word

Hazard statement

Danger

- Extremely flammable gas
- Contains gas under pressure; may explode if heated
Contains refrigerated gas; may cause cryogenic burns or injury
- May cause drowsiness or dizziness
- Harmful to aquatic life

CONTACT INFORMATION WITHIN COMPANY

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DATE OF ISSUE / REVISION, ADDITIONAL INFORMATION

Ver. 1 : Issued on march 26, 2014 (JP revised version 1: issued on July 1, 2012)

Revised : None

Special remarks: None