

## 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 glycol (1,2-ethanediol, CAS No. 107-21-1)

### GENERAL STATEMENT

Ethylene glycol is a colorless odorless liquid that is heavier than water and readily soluble in water. It is one of the main raw materials of polyethylene terephthalate (PET resin). Because of its low toxicity, high water solubility and low melting point, ethylene glycol is often used as antifreeze liquid.

Ethylene glycol cause damages to organs (kidney, central nervous system), may cause respiratory irritation.

To minimize health hazards resulting from inhalation of or skin or eye contact with ethylene glycol, inhalation and dermal exposure to it should be prevented when it is used in manufacturing processes or for industrial purposes. Workers are advised to wear appropriate protective masks, clothing and gloves made of materials that ethylene glycol does not penetrate. Consumers are advised to use ethylene glycol in compliance with the manufacturer's instruction manual if available. Users are also advised to take effective measures to prevent leakage and conduct regular monitoring and maintenance and inspection of facilities to minimize the effect on environmental organisms.

### CHEMICAL IDENTITY

Item	Contents
Generic name	Ethylene glycol
Trade name	Ethylene glycol
Chemical name	1,2-ethanediol (IUPAC name: Ethylene glycol)
CAS No.	107-21-1
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)-230 EC No. 203-473-3
Molecular formula	C <sub>2</sub> H <sub>6</sub> O <sub>2</sub>

Structural formula



Other information

None in particular

## USES AND APPLICATIONS

Intended uses of our product As a synthetic raw material for polyethylene terephthalate, polyester and PET bottles. Also as an antifreeze liquid.

## PHYSICAL/CHEMICAL PROPERTIES

A colorless odorless liquid that is heavier than water and readily soluble in water.

Appearance (physical state)	Liquid
Color	Colorless
Odor	None
Specific gravity (relative density)	1.1
Melting point/boiling point	-13°C/197.6°C
Combustibility/flammability	Not classified
Flash point	111°C (Closed cup)
Upper/lower limit of combustion or explosion	15.3 vol % / 3.2 vol %
Auto ignition temperature	398°C
Vapor pressure	10 Pa (20°C)
Molecular weight	62.07
Water solubility	Readily soluble
Octanol-water partition coefficient	LogKow: -1.36

## HEALTH EFFECTS

Ethylene glycol cause damages to organs (kidney, central nervous system), may cause respiratory irritation.

Effect assessment	Results (GHS <sup>*1</sup> hazard classification)
Acute toxicity (oral ingestion)	Not classified <sup>*2</sup>
Acute toxicity (inhalation)	Not applicable <sup>*3</sup> (gas) Classification not possible <sup>*4</sup> (vapor) Classification not possible (dust/mist)
Acute toxicity (dermal)	Not classified
Skin corrosion/irritation	Classification not possible
Serious eye damage/eye irritation	Classification not possible
Respiratory sensitization	Classification not possible
Skin sensitization	Classification not possible
Germ cell mutagenicity	Not classified
Carcinogenicity	Classification not possible
Reproductive toxicity	Classification not possible

Specific target organ toxicity (Single exposure)	Causes damage to organs (kidney, central nervous system) (Category 1) and May cause respiratory irritation (Category 3)
Specific target organ toxicity (Repeated exposure)	Classification not possible
Aspiration hazard	Classification not possible
Source/remarks	<p>*<sup>1</sup> 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.</p> <p>*<sup>2</sup> Not classified: Hazardousness much lower than the lowest hazard class specified by GHS</p> <p>*<sup>3</sup> Not applicable: Because the physical properties defined by GHS are not met, the chemical is not included in the target chemicals of the classification.</p> <p>*<sup>4</sup> Classification not possible: The data needed for judging classification are not available at all or sufficient data are not collected for classification.</p>

## ENVIRONMENTAL EFFECTS

Ethylene glycol is readily biodegradable and its bioaccumulation is low.

Effect assessment	Results (GHS hazard classification)
Hazardous to the aquatic environment (acute)	Not classified
Hazardous to the aquatic environment (chronic)	Not classified
Environmental fate/dynamics	Results
Transfer in the environment	Its volatility from the water system is low and its adsorptivity to soil is not high.
Biodegradability	Readily biodegradable
Bioaccumulation	Bioaccumulation is low.
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

Workers, consumers and the environment are mainly exposed to ethylene glycol.

Details	No.	Possibility of exposure to ethylene glycol in the process of use of our products (exposure route)
Workers	1-1	Mainly in the process of sampling, transferring and spraying operations (inhalation or skin or eye contact). Because ethylene glycol is manufactured in a closed system process, the possibility of workers being exposed to it is very low.
Consumers	2-1	At the time of use of consumer products containing ethylene glycol such as antifreeze liquid (inhalation, skin or eye contact, accidental ingestion)
Environment	3-1	Mainly in the process of manufacturing or use (atmospheric environment and water system)

	Because ethylene glycol is manufactured in a closed system process, the possibility of environmental release is very low. It is liquid at room temperature and normal pressure. In the case of environmental release, it disperses in the water system. It is likely to be degraded in the water system relatively rapidly. Lower levels of ethylene glycol may be discharged from wide areas because it is contained in consumer products such as antifreeze liquid.
Warnings	The possibility of exposure to ethylene glycol may exist in the process of using our products for other purposes. In this case, appropriate action should be taken in consideration of the risk management recommendations.

### RISK MANAGEMENT RECOMMENDATIONS

To minimize health hazards resulting from inhalation of or skin or eye contact with ethylene glycol, inhalation and dermal exposure to it during sampling operation should be prevented. Workers are advised to wear appropriate protective masks, clothing and gloves made of materials that ethylene glycol does not penetrate. Consumers are advised to use ethylene glycol in compliance with the manufacturer's instruction manual if available.

Users are advised to take effective measures to prevent leakage and conduct regular monitoring and maintenance and inspection of facilities to minimize the effect on environmental organisms.

Details	No.	Management recommendations based on our risk assessment results
Measures for protecting workers from being exposed to ethylene glycol	1-1	Wear appropriate protective masks, clothing and gloves made of materials that ethylene glycol does not penetrate during sampling operation. The American Conference of Governmental Industrial Hygienists (ACGIH) sets the threshold limit value of ethylene glycol in the work environment at 100 mg/m <sup>3</sup> (maximum) and recommends that the concentration in the place of manufacturing or use should be controlled and regulated to levels below this environmental concentration. The operation manager instructs workers how to select and use the appropriate protective equipment and how to manage the work place.
Measures for protecting consumers from being exposed to ethylene glycol	2-1	Use the products containing ethylene glycol in compliance with the instruction manual attached to them.
Measures for protecting the environment from being exposed to ethylene glycol	3-1	Install exhaust-gas and drainage treatment equipment and take effective measures to prevent leakage because a leakage will have an adverse effect on the environment. Control and handle the products containing ethylene glycol with routine care.
Other warnings		The facility should be designed so that objects that get very hot or become ignition sources are not placed near the section where products containing ethylene glycol are handled.
Warnings		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.

(Note) The numbers displayed in the table correspond to the measures and actions for 'Possibilities of

Exposure' described in the section of 'Exposure.'

## STATE AGENCY REVIEW

Assessment document	Review condition
OECD HPV	<a href="http://webnet.oecd.org/Hpv/UI/SIDS_Details.aspx?id=AACF6F16-58AA-4801-AC76-4437E9B62ED4">http://webnet.oecd.org/Hpv/UI/SIDS_Details.aspx?id=AACF6F16-58AA-4801-AC76-4437E9B62ED4</a>
National Institute of Evaluation and Technology (NITE) - Preliminary Risk Assessment of Chemical Substances	<a href="http://www.safe.nite.go.jp/risk/files/pdf_hyoukasyo/043riskdoc.pdf">http://www.safe.nite.go.jp/risk/files/pdf_hyoukasyo/043riskdoc.pdf</a>
Ministry of Environment - Preliminary Environment Risk Assessment of Chemical Substances	<a href="http://www.env.go.jp/chemi/report/h16-01/pdf/chap01/02_2_4.pdf">http://www.env.go.jp/chemi/report/h16-01/pdf/chap01/02_2_4.pdf</a>
REACH	<a href="http://apps.echa.europa.eu/registered/registered-sub.aspx">http://apps.echa.europa.eu/registered/registered-sub.aspx</a>

## REGULATORY INFORMATION / LABELLING INFORMATION

Main regulatory information

Law	Regulatory condition
UN class	Unspecified
UN No.	Unspecified
Fire Service Act	Hazardous Materials Class 4, Class 3 Petroleum, Water-soluble, Hazard Class III
Industrial Safety and Health Act	Article 57, Paragraph 2 Substances Requiring Notification
Act for the Prevention of Marine Pollution and Maritime Disasters	Marine Pollutants in the Case of Bulk Transportation (Class Y)

Labelling information

Pictograms or symbols



Signal Word

Danger

Hazard statement

- H370: Causes damages to organs (kidney, central nervous system)
- H335: May cause respiratory irritation

Precautionary statement

- [Prevention]
- P260: Do not breathe dust/fume/gas/mist/vapours/spray.
  - P264: Wash hands thoroughly after handling.
  - P270: Do not eat, drink or smoke when using this product.
  - P271: Use only outdoors or in a well-ventilated area.

[Response]

- P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P307+P311: IF exposed: Call a POISON CENTER or doctor/physician.
- P321: Specific treatment (see SDS Section 4 Emergency Measures).

[Storage]

- P403+P233: Store in a well-ventilated place. Keep container tightly closed.
- P405: Store locked up.

[Disposal]

- P501: Dispose of contents/container to local/regional/national/international regulations.

#### CONTACT INFORMATION WITHIN COMPANY

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