PT.DANISWARA GAS INDONESIA (1514376-H)

SAFETY DATA SHEET
ETHYLENE OXIDE

SECTION 1 : PRODUCT AND COMPANY INFORMATION

1.1 Product Identifier

Product Form	Substance
Product Name	Ethylene Oxide
Other means of Identification	Oxirane

1.2 Relevant Identified use of the substance or mixture and uses advised against

Identified uses	Industrial and professional use. Use as directed.
Uses advised against	Other uses except as directed.

1.3 Details of supplier of Safety Data Sheet

Name of Supplier	PT.DANISWARA GAS INDONESIA
Address	Kawasan Industri Candi tahap V
	JL.Dezel Blok D3 No.12A Ngaliyan SemaranG
Contact Number	+62 811-8000-8895

1.4 Emergency telephone number

Emergency contact number	+62 811-8000 -8895

SECTION 2 : HAZARDS IDENTIFICATION

2.1 Classification of the Ssubstance or mixture

Flam. Gas 1	Flammable gases category 1
Press. Gas	Gases under pressure (Compressed gas)
Acute Tox. 3 (inh)	Acute toxicity category 3 (inhalation)
Skin Irrit. 2	Skin corrosion or irritation category 2
Eye Irrit. 2	Serious eye damage or eye irritation category 2
Muta. 1B	Germ cell mutagenicity category 1B
Carc.1B	Carcinogenicity category 1B
STOT SE 3	Specific target organ toxicity – single exposure category 3

2.2 GHS-MY Labelling

Hazard Pictograms (GHS-MY):



GHS02 GHS04 GHS06 GHS08

Signal Word (GHS-MY)	Danger

2.3 Hazard Statements (GHS-MY):

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
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.

2.4 Precautionary Statements (GHS-MY):

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces – No smoking.
P261	Avoid breathing dust/fume/ gas/mist/vapours/spray.
P264	Wash hands thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position 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.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P311	Call a POISON CENTER or doctor/physician.
P321	Specific treatment (see Section 4).
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P337 + P313	If eye irritation persists: Get medical advice/attention.

P362	Take off contaminated clothing and wash before reuse.
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
P405	Store locked up.
P501	Dispose of contents/ container in accordance with local/ regional/ national/ international regulations.
CGA-PG02	Protect from sunlight when ambient temperature exceeds 52°C (125°F)
CGA-PG05	Use a back flow preventive device in the piping
CGA-PG06	Close valve after each use and when empty.
CGA-PG10	Use only with equipment rated for cylinder pressure.
CGA-PG14	Approach suspected leak area with caution.
CGA-PG21	Open valve slowly.

2.5 Other Hazards:

Inhaling will cause delayed nausea.
Inhalation of high concentration results in a narcotic and possible neurotoxic effect- possible followed by coughing, vomiting, and irritation to the respiratory passages which will eventually lead to emphysema, bronchitis, and pulmonary edema.
It had been reported to cause rapid olfactory fatigue. The neurotoxic or narcotic effect results in respiratory failure with acute pulmonary edema.
Comas with metabolic acidosis and oxaluria have also been observed.
It has been known to cause chronic intoxication in humans. Exposure may cause toxicity to the human reproductive system including spontaneous abortions.
Chromosomal aberrations have been detected in ethylene oxide exposed workers.

SECTION 3 : COMPOSITION / INFORMATION ON INGREDIENTS

Substance:

Ingredients	CAS Number	%	Hazard Statement
Ethylene Oxide	75-21-8	100	Flam. Gas 1, H220 Press. Gas (Liq), H280 Acute. Tox. 3, H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319, Muta. 1B, H340 Carc. 1B, H350 STOT SE 3, H335

SECTION 4 : FIRST-AID MEASURES

4.1 Description of first aid measures

Eye Contact	If eyes contact directly with high pressure gas, flush eyes with cool water for 15 minutes and get medical attention immediately.
Inhalation	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention. In the event of cardiac arrest apply external cardiac massage. Keep victim warm and quiet. PROMPT MEDICAL ATTENTION IS MANDAROTY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.
Skin Contact	Remove contaminated clothing and shoes immediately. Liquid may cause cold burn: remove contaminated clothing and gently flush affected areas with warm water for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention. Get medical attention if symptoms occur.
Ingestion	Ingestion is not considered a route of exposure.

4.2 Most important symptoms / effects, acute and delayed

Contact with rapidly expanding gas may cause burns or frostbite.
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.
As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

4.3 Indication of immediate medical attention and special treatment needed, if necessary.

If breathing is difficult, give oxygen. Obtain medical attention if breathing difficulty persists.

SECTION 5 : FIRE-FIGHTING MEASURES

5.1 Extinguishing Media

Suitable extinguishing media	Dry chemical powder Water spray Fog
Unsuitable extinguishing media	Carbon Dioxide. Do not use water jet to extinguish.

5.2 Specific hazards arising from the chemical

Specific hazards	Product supports Combustion. Exposure to fire may cause cylinder to rupture / explode. EXTREMELY FLAMMABLE GAS.
Hazardous Combustion Products	Carbon monoxide

5.3 Special protective equipment and precautions for fire-fighters

Specific methods	Exposure to fire may cause containers to rupture/explode. If possible, stop flow of product. Continue spray water from protected area to ensure the container stays cool. Move containers away from the fire area if this can be done without risk.
Special protective equipment	In confined space use self-contained breathing apparatus. Use EN 137 – Self-contained open circuit compressed air breathing apparatus with full face mask. Use EN 469 – Protective clothing for firefighters. Use EN15090 – Footwear for firefighters. Use EN 659 – Protective gloves for firefighters. Use EN 443 – Helmets for fire fighting in buildings and other structures.
Fire-fighting instructions	Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

SECTION 6 : ACCIDENTAL RELEASE MEASURES

6.1	Personal precautions, protective equipment and emergency procedures	Evacuate area. Provide adequate ventilation. Eliminate ignition sources. Wear self-contained breathing apparatus when entering contamination area unless atmosphere is proven to be safe.
6.2	Environmental precautions	Try to stop release.

		Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous.
6.3	Methods and material for containment and cleaning	Provide adequate ventilation. Do not enter without breathing apparatus unless it is declared safe. Dispose of contents/ container in accordance with local/ regional/ national/ international regulations.

SECTION 7 : HANDLING AND STORAGE

7.1	Precautions for safe handling	Only properly trained or experienced persons should handle the gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect cylinders from physical damage: do not drag, roll, slide or drop. Consider pressure relief device in gas installations. Ensure the complete gas system is checked for leaks before use. Suck back of water into the container must be prevented. Do not allow back feed into the container. Never use direct flame or electrical heating devices to raise the pressure of cylinder. Do not breathe gas. Avoid contact with skin and eyes. Avoid release of product into atmosphere. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty.
7.2	Conditions for safe storage, including any incompatibilities	Observe all regulations and local requirements on the storage of containers. Store in segregated and approved area. Keep away from ignition sources (including static discharges). Keep container below 50°C in a well-ventilated place. Use a 'first-in-first-out' inventory system to prevent full cylinders being stored for excessive periods of time. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent falling over.

SECTION 8 : EXPOSURE CONTROLS and PERSONAL PROTECTION

8.1 Control Parameters

Ethylene Oxide (75-21-8)	WEL TWA : 9.2 mg/m3 : 5 ppm Carc (Capable of causing cancer and/or heritable genetic damage)

8.2 Appropriate engineering controls

Provide adequate general and local exhaust ventilation.
Ventilation should be designed in such a manner that no personnel is exposed to concentrations of ethylene oxide exceeding the TLV of 1 ppm.
Systems under pressure should be regularly checked for leakages.
Oxygen detectors should be used when asphyxiating gases may be released.
Consider the use of a work permit system e.g. for maintenance activities.

8.3 Personal Protective Equipment

Respiratory protection	Self- contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres. Use standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Hand Protection	Wear working gloves when handling gas containers. Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Eye / Face Protection	Safety glasses with side shields recommended when handling cylinders. Standard EN166 personal eye protection recommended.
Skin and Body Protection	Safety shoes are recommended when handling cylinders.

SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Colorless gas
Odor	Ethereal
Odor threshold	No data available
pH	Not applicable
Relative Evaporation Rate (butyl acetate =1)	Not applicable

Relative Evaporation Rate (ether =1)	Not applicable
Melting point	-112°C
Freezing point	-112°C
Boiling point	10.4°C
Flash point	Not applicable
Critical Temperature	196°C
Auto-ignition temperature	435°C
Decomposition temperature	No data available
Flammability (solid, gas)	Flammable Gas
Upper/lower explosion or flammability limits	2.6% - 100%
Vapour Pressure	1.4 bar (20°C), 3.9 bar (50°C)
Relative vapour density at 20℃	No data available
Relative density	0.89 (water = 1)
Density	No data available
Relative gas density	1.5 (air = 1)
Solubility (H_2O)	No data available
Log Pow	No data available
Viscosity	Not applicable
Explosive properties	No data available
Oxidizing properties	Not applicable
Explosive limits	No data available

9.2 Other Information

No additional information available.

SECTION 10 : STABILITY AND REACTIVITY

Reactivity	No reactivity hazard other than the effects described in sub-section below
Chemical Stability	Unstable at elevated temperatures. May react explosively even in the absence of air. Risk of polymerization.
Possibility of Hazardous Reactions	Exothermic reactions with acids. May form explosives mixtures with air

Conditions to Avoid	Keep away from heat/sparks/open flames/hot surfaces – No smoking. May decompose at high temperatures. Avoid moisture in installation system.
Incompatible Materials	Oxidizers, air.
Hazardous Decomposition Products	Thermal decompositions may produce carbon monoxide.

SECTION 11 : TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute Toxicity (oral)	LC_{50} (rat) : 1440ppm (4 hours)
Acute Toxicity (dermal)	Not classified
Acute Toxicity (inhalation)	LD_{50} : (rat) : 2920 ppm
Skin Corrosion / Irritation	Corrosive to skin, causes burns.
Serious Eye Damage / Irritation	Corrosive to eyes, causes burns.
Respiratory Sensitization	Not classified
Skin Sensitization	Not classified
Germ Cell Mutagenicity	Laboratory studies with mice have shown that acute exposure to Ethylene Oxide at 300ppm and above caused testicular injury.
Carcinogenicity	May cause cancer.
Reproductive toxicity	Not classified
Specific Target Organ Toxicity – Single Exposure	Category 3 – Respiratory Tract Irritation
Specific Target Organ Toxicity – Repeated Exposure	Not classified
Aspiration hazard product	Not Applicable

SECTIO ৲ 12 : ECOLOGICAL INFORMATION

Acute toxicity	LC_{50} (Daphnia) : 200 mg/L (48 hours) LC_{50} (Algae) : 240mg/L (72 hours) LC_{50} (Fish) : 84mg/L (96 hours)
Persistence and Degradability	Not applicable to gases and gas mixtures.
Bioaccumulative Potential	The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.
Mobility in Soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Other Adverse Effects	No other known ecological damage caused by this product.

SECTION 13 : DISPOSAL INFORMATION

Waste From Residues / Unused Products	Do not discharge into any place where its accumulation could be dangerous. Disposal of this product should comply with the requirement of environmental protection and waste disposal legislation.
Contaminated Packaging	Do not reuse empty containers. Empty remaining contents. Dispose of container and unused contents in accordance with local and national regulation. Return cylinder to supplier.

SECTION 14 : TRANSPORT INFORMATION

UN Number	UN1040
Transport hazard class(es)	2.1 Flammable gas 2.3 Toxic Gas
UN Proper Shipping Name	ETHYLENE OXIDE
Packing Group	-
Hazard labels (DOT)	
Environmental Hazards	None
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not Applicable
Special precautions for user	None
Additional Information	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation - Ensure that containers are firmly secured - Ensure cylinder valve is closed and not leaking - Ensure valve outlet cap nut or plug (where provided) is correctly fitted

Ensure valve protection device (where provided) is correctly fitted

Transport by sea

No. UN (IMDG)	UN1040
Class (IMDG)	2.1 Flammable gas
	2.3 Toxic gas
Proper Shipping Name	ETHYLENE OXIDE

Transport by air

No. UN (IATA)	UN1040
Class (IATA)	2.1 Flammable gas
	2.3 Toxic gas
Proper Shipping Name	ETHYLENE OXIDE

SECTION 15 : REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/ laws specific to the substance or mixture

Occupational Safety and Health Act 1994 and relevant regulations:

Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013

Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000.

Environment Quality Act 1974 & regulations:

Environment Quality (Clean Air) Regulations 2014

Environment Quality (Scheduled Wastes) Regulations 2005

15.2 International Regulations

Ensure all national/local regulations are observed.

SECTION 16 : OTHER INFORMATION

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contain herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s). English is the governing language of this Safety Data Sheet and shall prevail over any translations that shall be made of this data sheet. In case of divergent interpretation of the Malay and English texts, the English text shall prevail.

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