SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier	:	Propylene
Other means of identification	:	Propene
Recommended use of the chemical and restrictions on use	:	This product is used as raw material for polypropylene, ethyl hexanol, normal butanol, and iso butanol.
Manufacturer	:	PT Pertamina (Persero) Jl. Medan Merdeka Timur 1A Jakarta Pusat ZIP Code 10110 Phone: 1500-000 Email: pcc@pertamina.com
Emergency phone number	:	1500-000

2. HAZARD IDENTIFICATION

Classification : Flammable gas, category 1
Liquefied gas

Signal word : Danger

Hazard statement :
Physical Hazard
H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.

Precautionary statement :
Prevention
P210 - Keep away from heat, open flames, sparks, hot surfaces. – No smoking.
Response
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.
Storage
P403 - Store in a well-ventilated place.

Pictogram :

Other hazards which do not result in classification : Other hazards not contributing to the classification : Contact with liquid may cause cold burns/frostbite.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration (%)
Propene	115-07-1	>99.6
Impuritis (C1, C2, C4, CO, CO2, Water content, Total Sulfur)	-	<0.4

4. FIRST AID MEASURES

Necessary description

- **In case of eye contact** : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the

4. FIRST AID MEASURES

eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.

- **In case of skin contact** : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.
- **If inhaled** : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply cardiopulmonary respiration if breathing stopped.
- **If swallowed** : Ingestion is not considered a potential route of exposure.

Most important symptoms/effects : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of coordination.

Indication of Immediate medical attention and special treatment needed, if necessary : Recommendations to physicians: Provide oxygen.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog

Unsuitable extinguishing media : No data available.

Specific hazards

- **Fire hazard** : EXTREMELY FLAMMABLE GAS. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.
- **Explosion hazard** : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

Flash point °C : -107.8 °C (-162°F)

Flammability value : 2 - 11.1

Hazardous chemical composition : Thermal decomposition or burning may produce carbon monoxide, carbon dioxide, and hydrogen. The welding and

5. FIRE-FIGHTING MEASURES

cutting process may form reaction products such as carbon monoxide and carbon dioxide. Other decomposition products of normal operation originate from the volatilization, reaction, or oxidation of the material being worked.

Special protective actions for fire fighters

a. Carbon dioxide (CO_2)	:	Spray to the origin of fire in the same direction with the wind.
b. Dry chemical	:	Spray to the origin of fire in the same direction with the wind.
c. Water spray or fog	:	Spray to the origin of fire in the same direction with the wind.
Special protective equipment for fire-fighter	:	Normal firefighters' equipment consists of an appropriate SCBA (open-circuit positive pressure compressed air type) in combination with fire kit. Equipment and clothing to the following standards will provide a suitable level of protection for firefighters.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures	:	Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Evacuate area. Eliminate ignition sources. Consider the risk of potentially explosive atmospheres. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Environmental precautions	:	Prevent spill into drainage, sewage system, or it seepage into the soil.
Procedures	:	Report spill according to the valid system and procedures. If spill can go into drainage or streams, do immediate report to the authority.
Methods and materials for containment and cleaning up	:	Immediately contact personnel. Stop spillage without any risk. Use non-spark and explosion-proof equipments. Ventilate area. Evacuate area and keep away from sources of ignition until the liquid evaporates.

7. HANDLING AND STORAGE

Precautions for safe handling	:	The substance must be handled in accordance with good industrial hygiene and safety procedures. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Take precautionary measures against static discharges. Ensure equipment is adequately earthed. Purge air from system before introducing gas. Keep away from ignition sources (including

7. HANDLING AND STORAGE

static discharges). Do not smoke while handling product. Assess the risk of a potentially explosive atmosphere and the need for explosion-proof equipment. Consider the use of only non-sparking tools. Ensure the complete gas system has been (or is regularly) checked for leaks before use. Avoid suckback of water, acid and alkalis. Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification. Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other container.

Conditions for safe storage (including any incompatibilities) : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

- **Exposure limit** : TWA 500 ppm.
- **Biological exposure indicator** : No data available.

Appropriate engineering control : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Systems under pressure should be regularly checked for leakages. Keep concentrations well below occupational exposure limits. Gas detectors should be used when quantities of flammable gases/vapors may be released. Provide adequate general or local ventilation. The substance is not classified for human health hazards or for environment effects and it is not PBT or vPvB so that no exposure assessment or risk characterization is required. For tasks where the intervention of workers is required, the substance must be handled in accordance with good industrial hygiene and safety procedures. Consider work permit system e.g. for maintenance activities. Product to be handled in a closed system.

Individual protection measures

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- **Eye and face protection** : Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.
- **Skin protection** : Gloves constructed of nitrile, neoprene, or PVC are recommended. If potential for significant exposure to liquid exists, use full protective clothing and chemical boots.
- **Respiratory protection** : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
- **Hygiene practices** : Wash hand thoroughly after handling.
  Do not eat or drink when using this product.
  Do not smoke while using this product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Characteristic		Test Result
Organoleptic (physical appearance, color, etc)	:	Gas, colorless
Odor	:	Stenchant often added. Sweetish.
Odor threshold	:	Odour threshold is subjective and inadequate to warn for over-exposure.
pH	:	Not applicable.
Melting/freezing point	:	-185.25 °C (-301.45°F)
Boiling point/boiling range	:	-47.72 °C (-53.9°F)
Flammability	:	Extremely flammable
Flash point	:	-107.8 °C (-162°F)
Evaporation rate	:	No data available
Lower/upper flammability limit and explosion limit	:	2 - 11.1
Vapor pressure	:	10.2 bar (132.81 psig) at70°F (21.1 °C)
Vapor density	:	0.52 – 0.53 g/cm^3
Relative density	:	0.5226
Solubility		
• **Water solubility**	:	384 mg/l
• **Other solubility**	:	No data available
Partition coefficient (n-octanol/water)	:	1.77 at 20 °C*
Auto-ignition temperature	:	455 °C (851°F) at 101.3 kPa*

9. PHYSICAL AND CHEMICAL PROPERTIES

Characteristic		Test Result
Decomposition temperature	:	No data available
Viscosity	:	No data available.

*Data refers to ECHA Europe

10. STABILITY AND REACTIVITY

Reactivity	:	Hazardous substance polymerization does not occur.
Chemical stability	:	Stable under normal conditions.
Posibility of hazardous reactions	:	Can form explosive mixture with air. May react violently with oxidants.
Conditions to avoid	:	Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Incompatible materials	:	Oxidizing agent. Acids. Halogens.
Hazardous decomposition products	:	Thermal decomposition or burning may produce carbon monoxide, carbon dioxide, and hydrogen. The welding and cutting process may form reaction products such as carbon monoxide and carbon dioxide. Other decomposition products of normal operation originate from the volatilization, reaction, or oxidation of the material being worked.

11. TOXICOLOGICAL INFORMATION

Comprehensive toxicological/health information

• **Acute toxicity**	:	Inhalation: LC50 (4h) >20 mg/l (rats) Ingestion: Not considered a potential route of exposure.
• **Skin corrosion/ irritation**	:	No data available. Suspected that it may not cause skin corrosion/irritation according to compound or product which has similar structure or composition.
• **Serious eye damage/irritation**	:	No data available. Suspected that it may not cause serious eye damage or irritation according to compound or product which has similar structure or composition.
• **Respiratory or skin sensitization**	:	No data available. Suspected that it may not cause respiratory or skin sensitization according to compound or product which has similar structure or composition.
• **Germ cell mutagenicity**	:	No data available. Suspected that it is not mutagen according to compound or product which has similar structure or composition.
• **Carcinogenicity**	:	No data available. Suspected that it may not cause cancer according to compound or product which has similar structure or composition.
• **Reproductive toxicity**	:	No data available. Suspected that it may not toxic to reproductive organs according to compound or product which has similar structure or composition.
• **STOT-single exposure**	:	No data available. Suspected that it is not toxic to specific

11. TOXICOLOGICAL INFORMATION

		organs after single exposure according to compound or product which has similar structure or composition.
• **STOT-repeated exposure**	:	No data available. Suspected that it is not toxic to specific organs after repeated exposure according to compound or product which has similar structure or composition.
• **Aspiration hazards**	:	No data available. Suspected that it is not aspiration hazards. This statement comes from compounds or products which have similar structures or compositions.
Information on the likely routes exposure	:	Inhaled and eye contact.
Symptoms related to the physical, chemical, and toxicological characteristics	:	No data available. Further testing has not been done.
Delayed and immediate effects, and also chronic effects from both short or long term exposure	:	No data available. Further testing has not been done.
Numerical measure of toxicity	:	No data available. Further testing has not been done.
Interative effects	:	No data available. Further testing has not been done.
Where specific chemical data are not available	:	No data available. Further testing has not been done.
Mixture	:	No data available. Further testing has not been done.
Mixture vs. Ingredient information	:	No data available. Further testing has not been done.
Other in formation	:	No data available. Further testing has not been done.

12. ECOLOGICAL INFORMATION

Ecotoxicity	:	Ecology-General : No ecological damage caused by this product. Short-term toxicity to fish: LC50 (4 days) 51,7 mg/L Short-term toxicity to aquatic invertebrates: LC50 (48 h) 28,2 mg/L Toxicity to algae and cyanobacteria: EC50 (4 days) 12,1 mg/L
Persistence and degradability	:	The substance is biodegradable. Unlikely to persist.
Bioaccumulative potential	:	No data available. Further testing has not been done.
Mobility in soil	:	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Other adverse effects	:	Effect on ozone layer : None Effect on global warming: No known effect from this product.

13. DISPOSAL CONSIDERATION

Disposal methods : Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.

14. TRANSPORT INFORMATION

USA DOT

UN Number	:	1077
UN proper shipping name	:	PROPYLENE
Transport hazard class(es)	:	2.1
Packing group (if available)	:	-
Environmental hazard	:	-
Special precautions for user (UN Model Regulation)	:	-

RID / ADR

UN Number	:	-
UN proper shipping name	:	-
Transport hazard class(es)	:	-
Packing group (if available)	:	-
Environmental hazard	:	-
Special precautions for user (UN Model Regulation)	:	-

IMO

UN Number	:	-
UN proper shipping name	:	-
Transport hazard class(es)	:	-
Packing group (if available)	:	-
Environmental hazard	:	-
Special precautions for user	:	-

ICAO / IATA

UN Number	:	1077
UN proper shipping name	:	Propylene
Transport hazard class(es)	:	2
Packing group (if available)	:	-
Environmental hazard	:	-
Special precautions for user (UN Model Regulation)	:	-

15. REGULATORY INFORMATION

Safety, health, and environmental regulation (specific for the product in question) : - Peraturan Menteri Perindustrian Nomor 23/M-IND/PER/4/2013 tentang Perubahan Atas Peraturan Menteri Perindustrian Nomor 87/M-IND/PER/9/2009 Tentang Sistem Harmonisasi Global Klasifikasi dan Label pada Bahan Kimia

14. TRANSPORT INFORMATION

- Peraturan Pemerintah Republik Indonesia, Nomor 74 Tahun 2001 Tentang Pengelolaan Bahan Berbahaya dan Beracun Presiden Republik Indonesia
- Keputusan Menteri Tenaga Kerja No Kep-187/Men/1999 tentang Pengendalian Bahan Kimia Berbahaya
- Peraturan Menteri Kesehatan Republik Indonesia Nomor 70 Tahun 2016 tentang Standar dan Persyaratan Kesehatan Lingkungan Kerja Industri
- ACGIH®. 2016. TLVs® and BEIs®

16. OTHER INFORMATION

Revision date : 2017

Key/legend or acronym used in the SDS :

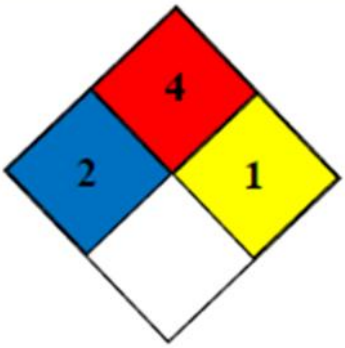
ACGIH® – The American Conference of Governmental Industrial Hygienists
ADR – European Agreement concerning the International Carriage of Dangerous Goods by Road
ANSI - American National Standards Institute
BEIs® – Biological Exposure Indices
CAS No. – Chemical Abstract Service Registry Number
ECHA – European Chemicals Agency
IATA – The International Air Transport Association
ICAO – The International Civil Aviation Organization
IMO – The International Maritime Organization
MSH - Mine Safety and Health Administration
NFPA - National Fire Protection Association
OSHA - Occupational Safety and Health Administration
PG – Packaging Group
PVC – Poly Vinile Chloride
RID – Regulation concerning the International Carriage of Dangerous Goods by Rail
SCBA – Self-Contained Breathing Apparatus
TLV - Threshold Limit Value
TWA - Time Weighted Average
UN – United Nations
USA DOT – United States Department of Transportation

Key literature references and sources for data used in the SDS : echa.europa.eu

NFPA :

Degrees	Red	Blue	Yellow
0	Will not burn	Live ordinary material	Normally stable
1	Must be preheated to burn	Slightly hazardous	Unstable if heated – use normal

16. OTHER INFORMATION



			precautions
2	Ignites when moderately heated	Hazardous – use breathing apparatus	Violent chemical change possible – use hose streams from distance
3	Ignites at normal temperatures	Extremely dangerous – use full protective clothing	Strong shock or heat may detonate - use monitors from behind explosion resistant barriers
4	Extremely flammable	Too dangerous to enter vapor or liquid	May detonate – vacate area if materials are exposed to fire

White	
	Radioactive
	Never contact with water

Disclaimer

The information is composed based on current knowledge and intended to describe safety, health, and environment hazard of the product. Therefore, it should not be construed as guarantee any specific property of the product. All risks while using this product is the user's responsibility. It is not allowed to make change of this document, except there is legal consent.