SAFETY DATA SHEET (SDS)

SDS in accordance with UN GHS Purple Book **CAP – SDS – 02 - Propylene (Rev.01)**

This SDS is effective as from 25 Jan 2019 and supersedes previous document published | Validity date: 25 Jan 2024

SECTION-1. IDENTIFICATION

Product/Material	:	**Propylene**
Recommended Use	:	Raw material for chemicals and petrochemical application, Production of polypropylene, propylene copolymers, chemical synthesis etc.
Manufacturer	:	**PT. CHANDRA ASRI PETROCHEMICAL Tbk. (CAP)**
Head Office	:	Wisma Barito Pacific, Tower A, 7th floor, Jl. Letjend S. Parman, Kav.62-63. Jakarta 11410, Indonesia.
Plant	:	Jl Raya Anyer Km.123, Ciwandan, Cilegon 42447, Indonesia. Ph: 62-254-601501
Emergency contact (24 hrs)	:	GROUPSHEDIVISION@capcx.com, Ph: 62-254-601829, 601501 Ext 1232
Additional Information	:	GROUPRND@capcx.com, Phone: +62-254-601501 Ext 1309, 1616

SECTION-2. HAZARD IDENTIFICATION

GHS Classification	:	Flammable Gas: Category 1 | Gas under pressure: Compressed gas | Target organ toxicant (central nervous system): Category 3
Hazard statements	:	Extremely flammable liquid and vapor | Contains gas under pressure; may explode if Heated | Toxic to aquatic life with long lasting effects | May be fatal if swallowed and enters airways | Harmful if swallowed | May cause cancer | May cause genetic defects | May damage fertility or the unborn child | Causes serious eye irritation | Causes skin irritation | May cause drowsiness or dizziness | May cause respiratory irritation.
Pictogram (Hazard Symbols)	:	
Signal Word	:	DANGER
NFPA Hazard Rating	:	Health = 1 Flammability = 4 Reactivity = 1
Precautionary Statements	:	Obtain special instructions before use | Do not handle until all safety precautions have been read and understood | Keep away from heat/sparks/open flames/hot surfaces – No Smoking | Keep container tightly closed | Keep cool | Ground/bond container and receiving equipment | Use explosion - proof electrical/ventilating/ lighting/equipment | Use only non-sparking tools | Take precautionary measure against static discharge | Wear protective gloves/protective clothing/eye protection/face protection | Use personal protective equipment as required | Do not eat, drink or smoke when using this product | Wash thoroughly after handling | Avoid release to the environment.

SECTION-3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Identity	:	Propylene (C_3H_6) CAS No : 115-07-1
Common Name	:	C3 Product, 1-propylene, 1-propene, methylethylene.
Concentration	:	≥ 99.4 % vol Impurities : ≤ 0.6 % vol

SECTION-4. FIRST-AID MEASURES

General advice	:	This product is of low acute toxicity. Simple asphyxiant, high concentrations can displace oxygen and cause drowsiness and dizziness. Possible cardiac sensitization. Contact with liquid may cause frostbite. Removed contaminated clothes except in the case of frostbite. Always observe self-protection methods. Move out of dangerous area. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Do not leave the victim unattended. Show this material safety data sheet to the doctor in attendance.
Skin contact	:	If frostbite has occurred, seek medical attention immediately; do not rub the affected area or flush with water. To prevent further damage, do not attempt to remove frozen clothing from affected area. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.
Inhalation	:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Keep patient warm and at rest. If breathing is difficult, give oxygen. If unconscious place in recovery position and seek medical advice. In the event of unconsciousness, apnea or cardiac arrest (no pulse) applies cardiopulmonary resuscitation.
Eyes contact	:	If eye tissue is frozen, seek medical attention immediately. If tissue is not frozen, thoroughly flush the eyes with large amount of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists seek medical attention.
Ingestion	:	Not applicable (gas)
Note to Physician	:	Treat unconsciousness, frostbite, nausea, hypotension, seizures and cardiac arrhythmia in the conventional manner. Administer oxygen by mask if there is respiratory distress. Treatment of overexposure should be direct at controlling the symptoms and clinical condition of a patient. After adequate first aid, no further treatment is necessary unless symptoms reappear.

SECTION-5. FIRE-FIGHTING MEASURES

Flammable Properties	:	Extremely flammable. Gas/air mixtures are explosive. In case of leakage high risk of fire. The gas is heavier than air and may travel along the ground ignition is possible. Vapors may form an explosive mixture with air. Keep containers away from source of heat or fire. Highly explosive in the presence of sparks, fire, heat and oxidizing agents.

Extinguishing Media

Suitable Extinguishing Media	:	Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog.
Unsuitable Extinguishing Media	:	Do not use solid water stream/may spread fire.

Specific Hazards in Case of Fire

Hazardous Combustion Products	:	Carbon oxides (CO, CO_2)

Special Protective Equipment and Precaution for Fire Fighter

Special Protective Equipment	:	Wear positive pressure self-contained breathing apparatus (SCBA). Structure Fire-fighters protective clothing will only provide limited protection. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
Precautions for Fire- Fighter	:	Keep away from sources of ignition (e.g., heat and open flames). Do not vent into atmosphere or enclosure unless area is sufficiently ventilated to reduce vapor concentrations below flammable limit.

SECTION-6. ACCIDENTAL RELEASE MEASURES

Personal Precautions : Remove or shut off all sources of ignition. Increase ventilation if possible.

Environmental Precautions : Prevent entry into waterways, sewers, basements or confined areas. If possible, turn leaking container so that gas escaped rather than liquid. Spillages of liquid product in the water will likely result in a quick and complete vaporization of the product. Isolate the area and prevent fire/explosion hazard for ships and other structures, taking into account wind direction and speed, until the product completely dispersed. Note: recommended measures area based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken.

Methods and Materials for Containment and Cleaning up : Wear appropriate protective equipment and clothing during cleanup. Individuals without appropriate protective equipment should be excluded from area of spill until clean-up has been completed.

SECTION-7. HANDLING AND STORAGE

Precautions for Safe Handling : Keep locked up or secured. Handle in fully enclosed, grounded, properly designed and approved flammable gas systems. Use with adequate ventilation. Avoid inhalation. Keep away from uncontrolled heat and incompatible materials. Ground all material handling and transfer equipment to dissipate build-up of static electricity. Wear suitable protective equipment including thermally protective gloves. No smoking or open flames permitted in storage, use or handling areas. Check for accumulation of liquids when breaking into pipelines.

Conditions for Safe Storage, including Incompatibilities : Storage area should be clearly identify, well illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store in grounded, properly designed and approved pressure containers and away from incompatible materials. Store and use away from heat, sparks, open flame, or any other ignition source. Store according to applicable codes or regulations for liquefied pressurized gases as applicable to: cylinders, vessels, piping, building, rooms, cabinets, allowable quantities and minimum storage distance. Have appropriate extinguishing capability in storage area (e.g. sprinkler system, portable fire extinguishers) and flammable gas detectors. Storage pressure vessels should be above ground and dike. Keep cylinders secure while in storage or in transportation.

See Section 8: Exposure Controls/Personal Protection for appropriate Personal Protective Equipment. See Section 10 for information on Incompatibilities.

SECTION-8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Information on the System Design : Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls of work practices are not adequate to prevent exposure to harmful levels of this material.

Exposure Limits

Component Name (CAS No)	Reference	TWA		STEL	
		ppm	mg/m^3	ppm	mg/m^3
Propylene (115-07-1)	ACGIH	500	-	NA	-

Ventilation : Control airborne concentrations below the exposure guidelines

Respiratory Protection : Use with adequate ventilation. If engineering controls and ventilation is not sufficient to prevent build-up of aerosols or vapors and/or oxygen concentrations

are low, appropriate air supplied breathing apparatus should be use.

Hand Protection : Use impervious gloves designed to prevent freezing of body tissues if contact with liquefied gas is possible. Wear chemical-resistant safety footwear with good traction to prevent slipping.

Eyes Protection : Wear safety glasses. Use of chemical goggles under a full-face shield is recommended if contact with liquefied vapor is possible.

Skin Protection : Work clothing that sufficiently prevents skin contact and prevents freezing of body tissues if contact with liquefied gas is possible should been worn, such as coveralls and/or long sleeves and pants. Fire resistant (i.e., Nomex) or natural fibber clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and would not recommend where flammable vapor releases may occur.

SECTION-9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance	Gas at ambient conditions, liquid under pressure
Color	Colorless
Odor	Gassy/Aromatic
Odor Threshold	270 – 600 ppm
pH	Not Applicable
Boiling Point/Boiling Range	- 48^{O}C (-54.4^{O}F)
Melting Point Flash Point	-185 ^{O}C -108^{O}C
Auto-ignition	455^{O}C (851^{O}F)
Flammable Classification	Extremely Flammable
Lower Flammable (explosion) Limit	2.0%
Upper Flammable (explosion) Limit	11.0%

Oxidizing Properties	No Data Available
Explosive Properties	No Data Available
Vapor Pressure	7060 mmHg at 20^{O}C
Evaporation Rate	Not Applicable
Solubility (water)	Negligible (<0.1%)
Relative Density at 104^{O}C (water=1)	0.51
Partition Coefficient (Octanol/Water Log Pow)	Not Applicable
Viscosity	No Data Available
Evaporation	No Data Available
Relative Vapor Density (air=1)	1.48
Additional Physical and Chemical properties	No additional information available

SECTION-10. STABILITY AND REACTIVITY

Chemical Stability : This product is stable under normal use conditions for shock, vibration, pressure or temperature.

Possibility of Hazardous reaction & Hazardous Polymerization : Hazardous polymerization not likely occurs. Under favorable and designed conditions, like high temperature and pressure, and when product is in liquid state, product may polymerize with metal coordination complexes or mixtures of lithium nitrate and sulfur dioxide.

Conditions to Avoid : Keep away from heat, spark, or open flame.

Substances to Avoid : Propylene reacts vigorously with oxidizing material. It reacts violently with oxides of nitrogen (nitrogen dioxide, NO_2, nitrous oxide, N_2O, and dinitrogen tetroxide, N_2O_4)

Hazardous Decomposition Products : Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Special Remarks : Vapors may form an explosive mixture with air. May polymerize explosively when heated or involved in a fire. May react vigorously with oxidizing agents. Liquefied gas may explode on contact with hot water (45^{O}C – 75^{O}C). (113^{O}F to 167^{O}F).

SECTION-11. TOXICOLOGICAL INFORMATION

Acute Toxicity : Similar hydrocarbon mixtures were tested under the EPA's High Production volume (HPV) Chemical Challenge Program. Propylene has been tested under the HPV test plan for the Olefins Panel of the ACC Propylene Streams Category. Based on

		testing, propylene has a low order of acute toxicity. Inhalation of propylene can produce narcosis and anesthesia; however, these effects are only seen at very high concentrations (reports indicate >46,000 ppm to induce narcosis in humans).Excessive exposures may cause headache, dizziness, nausea, loss of coordination, and in extreme conditions, coma and possible death. High concentrations may trigger heartbeat irregularities and possible cardiac sensitization. In the gaseous state propylene is not expected to be irritating to the skin or eyes. However, should skin or eye contact occur with this product in its liquid state, tissue freezing, severe cold burns, and/or frostbite may result.
4h inhalation-Rat LC50	:	>65,000ppm
Repeated Dose Toxicity	:	NOAEL was 10,000 ppm (highest dose tested) in rats and mice exposed to propylene for 14 weeks. Mild nasal inflammation and associated epithelial alterations were observed in rats and mice exposed to propylene for 103 weeks at 5,000 and 10,000 ppm. (no evidence of carcinogenicity).
Chronic Toxicity	:	Similar hydrocarbon mixtures were tested under the EPA's High Production volume (HPV) Chemical Challenge Program. Propylene has been tested under the HPV test plan for the Olefins Panel of the ACC Propylene Streams Category. Repeated exposure to propylene produces no clinical effects in animals exposed to concentrations up to 10,000 ppm, one half of the lower flammability limit, for 103 weeks. In the nasal cavity, propylene induced nasal lesions of relatively mild nature and relatively few animals were affected. Results indicated no carcinogenic effects found. A weak mutagenic response was observed with Salmonella typhimurium strains TA 1535 exposed to propylene in the presence of S9 mix but not in the absence of S9. It was not mutagenic in the other Salmonella strains (TA100, TA98 and TA1537) or in E.coli WP2uvrA (pKM101).
Carcinogenicity	:	ACGIH, EPA, IARS,OSHA, and NTP carcinogen lists have been checked for selected similar materials or those components with CAS registry numbers. Propylene (115-07-1) ACGIH: A4 – Not Classifiable as a Human Carcinogen IARC : Monograph 60 (1994); Supplement 7[1987] (Group 3(not classifiable)).
Special Remarks on Other Toxic Effect on Humans	:	Propylene that is inhaled is largely exhaled unchanged. A small fraction may be metabolized and transported in blood as propylene oxide. There is no known health effect found to be associated with this metabolism in 2-year cancer studies or in studies of potential adverse genetic effects.

SECTION-12. ECOLOGICAL INFORMATION

Eco toxicity	:	Similar hydrocarbon mixtures were tested under the EPA's High Production volume (HPV) Chemical Challenge Program. Propylene has been tested under the HPV test plan for the Olefins Panel of the ACC Propylene Streams Category. Aquatic toxicity was assessed with a model that is based on an equation developed for neutral organic chemicals, a reliable estimation method for the class of chemicals in streams from this category. Calculated toxicity values for two to four day exposures suggest that category members have the potential to produce moderate toxicity, based on an effect range of 10.5 to 100.8 mg/L for selected stream constituents
Mobility	:	Results of distribution modeling show that chemical constituents of streams in the Propylene Streams Category will partition primarily to the air compartment, with a negligible amount partitioning to water. In the air, these constituents have the potential to rapidly degrade through indirect photolytic processes mediated primarily by hydroxyl radicals. This is expected to be the dominant route of loss and degradation process for constituents of these streams. Aqueous photolysis and

hydrolysis will not contribute to the transformation of category constituents in aquatic environments because they are either poorly or not susceptible to these reactions

Persistence and Degradability

General : Although the biodegradability of streams in this category has not been evaluated with standard testing procedures because of their high volatility, studies have demonstrated that the predominant category constituents can be degraded by bacteria isolated from soil and surface water samples. The results from these studies show that selected stream constituents are subject to microbial degradation. However, biodegradation is unlikely to contribute to the overall degradation of constituents from these streams because they tend to partition to the air compartment.

Bioaccumulation Potential : Product is not expected to bioaccumulate

Biodegradation Potential : This material is expected to biodegrade under certain environmental conditions

SECTION-13. DISPOSAL CONSIDERATIONS

Waste disposal

Preferred disposal for this volatile, flammable product is through combustion. Vent to a burning flame at an approved facility. DO NOT ATTEMPT TO DISPOSE OF BY UNCOTROLLED IGNITION. Since emptied containers retain product residue, follow safe handling/label warnings even after container is emptied. Disposal must be in accordance with applicable federal, state, or local regulations.

See Section7: Handling and Storage and Section 8: Exposure controls/Personal Protection for additional handling information that may be applicable for safe handling and the protection of employees.

Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste

SECTION-14. TRANSPORT INFORMATION

UN Number	1077	
UN Proper Shipping name	Propylene, Refrigerated Liquid	
Transport Hazard Class	Road (ADR)/Rail (RID)/Water (ADNR)	2 (2.1 flammable gas)
	IMDG class (Marine Transport)	2 (2.1 flammable gas)
	ICAO/IATA class (Air Transport)	2 (2.1 flammable gas)
Packing Group	None	
Marine Pollutant	None	

SECTION-15. REGULATORY INFORMATION

Regulatory Information : KEPMENAKER 187/Men/1999 Pengendalian Bahan Kimia Berbahaya
PERMENLH RI No. 3 Year 2008: Tata Cara Pemberian Simbol dan Label Bahan Berbahaya dan Beracun.
PERMENPERIN RI No. 87/M-IND/PER/9/2009: Sistem Harmonisasi Global Klasifikasi dan Label pada Bahan kimia.

SECTION-16. OTHER INFORMATION

Training Advice : Personnel handling the product need to be demonstrably with its hazardous properties, with health and environmental protection principles related to the product and first aid principles

Recommended Uses : THE PRODUCT IS RESTRICTED TO PROFESSIONAL USAGE. Ensure all national/local regulations are observed. Ensure operators understand the flammability hazard. The hazard of asphyxiation is often overlooked and must be stressed during operator training. This Safety Data Sheet has been established in accordance with the applicable European. Directives and applies to all countries that

have translated the Directives in their national laws. Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. 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 contained 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.

Abbreviations that may have been used in this document:

ACGIH	:	American Conference of Governmental Industrial Hygienist
ADNR	:	European Agreement concerning the Int'l Carriage of Dangerous Goods by inland Waterways
ADR	:	European Agreement concerning the Int'l Carriage of Dangerous Goods by Road
CAS	:	Chemical Abstract Service
EPA	:	Environmental Protection Agency
EU	:	European Union
IATA	:	International Air Transport Association
ICAO	:	International Civil Aviation Organization
IMDG	:	International Maritime Dangerous Goods
IMO	:	International Maritime Organization
LC50	:	Lethal Concentration, concentration of chemical which kills 50% of a sample population
LD50	:	Lethal Dose, dose of a chemical which kills 50% of a sample population
NFPA	:	National Fire Protection Association
NTP	:	National Toxicology Program
PSHA	:	Occupational Safety and Health Administration
RID	:	International Rule for Transportation of Dangerous Substance by Railway
TLV	:	Threshold Limit Value
TWA	:	Time Weighted Averages

This Safety Data Sheet (SDS) contains the following historical revisions:

Rev No	Issued Date	Revision Change	Description
00	09 Jan 2015	Original Document	
01	25 Jan 2019	SECTION-02	NFPA was modified

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