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|  | Material Safety Data Sheet | Creation | 2009.11.25 |
| | | Revision | 2022.04.01 |
| | Propylene | Rev. No. | 3 |
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1. Chemical Product & Company Identification

- A. Product Name : **Propylene**
 B. Intended Use : PP manufacture, refrigerant
 C. Manufacturer/Supplier :

1) Manufacturer :

| | | | |
|--|----------------|-------|----------------|
| Hanwha TotalEnergies Petrochemicals Co.,Ltd | | | |
| 103, Dokgot2-Ro, Daesan-Eup, Seosan-Si, Chungnam, 31900, Korea | | | |
| T e l e p h o n e | 82-41-660-6415 | F a x | 82-41-660-6637 |

2) Supplier : (Product information: 041-660-6180)

| | | | |
|--|----------------|-------|----------------|
| Hanwha TotalEnergies Petrochemicals Co.,Ltd | | | |
| 17~20F Hanwha Finance Plaza, 92, Sejong-daero, Jung-gu, Seoul 04525, Korea | | | |
| T e l e p h o n e | 82-2-3415-9363 | F a x | 82-2-3415-9370 |

2. Hazard Identification

A. Hazard Category :

- 1) Physicochemical Hazards - Flammable gases : Category 1
Gases under pressure : Liquefied gas
- 2) Health Hazards - Specific target organ toxicity(Single exposure) : Category 3
(Narcotic effects)
- 3) Environmental Hazards - Chronic aquatic toxicity : Category 4

B. Precautionary Statement(s) & Warning Label

1) Symbol :



2) Signal Word : Danger

3) Hazard Statement(s) :

H220 Extremely flammable gas

H280 Compressed gas ; Contains gas under pressure; may explode if heated

H336 May cause drowsiness and dizziness.

H413 May cause long lasting harmful effects to aquatic life



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4) Precautionary Statement(s) :

■ Prevention

P210 Keep away from heat/sparks/open flames/hot surfaces. ? No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment

■ Response

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P312 Call a POISON CENTER or doctor/physician if you feel unwell.

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

■ Storage

P403 Store in a well-ventilated place.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

■ Disposal

P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards

NFPA ratings : Health=2, Fire=3, Reactivity=1



3. Composition / Information on ingredients

| Chemical Name | Other Name | CAS No. or EU No. | (%) |
|---------------|------------|--------------------------------|------|
| Propylene | Propene | 115-07-1 (EU No. 204-062-1) | 100% |

4. First Aid Measures

A. Eye Contact : Flush thoroughly with water at least 15minutes.

Get medical assistance. Get medical attention immediately.

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|---|-----------------------------------|------------------|------------|------|
|   | Do not rub your eyes. | Creation | 2009.11.25 | |
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B. Skin Contact : For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41 C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.
Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Laundering enough contaminated clothing before reuse. Get medical attention immediately.

C. Inhalation : If inhaled, remove to fresh air.
If not breathing give artificial respiration.
If breathing is difficult, give oxygen.
Get medical aid.

D. Ingestion : Ingestion is unlikely.
About whether I should induce vomiting Take the advice of a doctor.
Rinse your mouth with water immediately.
Get medical attention immediately.

E. Likely Acute or Delayed Symptoms/Effects :

1) Inhalation

- Short term exposure : causing tear, vomiting, suffocation, dizziness, coma, convulsions
- Long term exposure : Not available

2) Skin contact

- Short term exposure : frostbite, blister
- Long term exposure : Not available

3) Eye contact


- Short term exposure : frostbite, vision blurred
- Long term exposure : Not available

4) Ingestion

- Short term exposure : frostbite
- Long term exposure : Not available

F. Emergency measure / Notes to physician : Give to oxygen.

Notify medical personnel of contaminated situations and have them take appropriate protective measures.

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5. Fire Fighting Measures

A. Extinguishing media :

1) Suitable extinguishing media

: For small fire - Use dry chemical, carbon dioxide, water spray to extinguish gas (only if absolutely necessary and safe to do so).

DO NOT use water jets.

For large fire - Cool cylinder by direct flooding quantities of water onto upper surface until well after fire is out.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

※ DO NOT EXTINGUISH BURNING GAS UNLESS LEAK CAN BE STOPPED SAFELY:
OTHERWISE: LEAVE GAS TO BURN.

2) Unsuitable extinguishing media : **Avoid use of water jet for extinguishing**

3) Unusual fire(big fire) : Do use extinguishing media with water fog.

B. Unusual fire & Explosion hazard :

1) Hazardous combustion product : Carbon oxides

(carbon monoxide (CO), carbon dioxide (CO₂))

2) Fire & Explosion hazard :

HIGHLY FLAMMABLE: This product will ignite at ambient temperature and can be expected to form a flammable to the atmosphere. May burn with an almost invisible flame in bright light.

High-pressure gas; May explode when heated.

Fire exposed containers may vent contents through pressure relief valves thereby increasing fire intensity and/ or vapour concentration.

Fire may produce irritating, poisonous or corrosive gases.

Runoff may create fire or explosion hazard.

May decompose explosively when heated or involved in fire.

High concentration of gas may cause asphyxiation without warning.

C. Special fire fighting procedure / protection of firefighters :

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Flammable, high-pressure gas. Evacuate all personnel from danger area.

Keep unauthorized personnel out.

Notify your local firestation and inform the location of the fire and characteristics hazard.

Using a unattended and water devices in case of large fire and leave alone to burn if you

do not imperative.



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Avoid inhalation of materials or combustion by-products.

Do not access if the tank on fire.

Leaking gas fire: do not extinguish, unless leak can be stopped safely.

Remove sources of ignition.

The only safe way to extinguish a flammable gas fire is to stop the flow of gas.

Extinguishing the fire without stopping the gas flow may permit the formation of ignitable or explosive mixtures with air.

6. Accidental Release Measures

A. Personal precautions :

Shut off all sources of ignition.

Wear self-contained breathing apparatus.

Flammable, high-pressure gas. Forms explosive mixtures with air.

Ventilate closed spaces before entering.

Must work against the wind, let the upwind people to evacuate.

Handling the damaged containers or spilled material after wearing protective equipment.

B. Environmental precautions :

1) atmosphere release : Not available

2) soil release : Not available

3) underwater release : Prevent runoff and contact with waterways, drains or sewers.

If large amounts have been spilled, inform the relevant authorities.

C. Spill cleanup methods :

1) Small liquid spill : Not available

2) Large spillages : Stay upwind and keep out of low areas. Dike for later disposal.

Notification to central government, local government. When emissions at least of the standard amount

Dispose of waste in accordance with local regulation.

Appropriate container for disposal of spilled material collected.


Prevent the influx to waterways, sewers, basements or confined spaces.

7. Handling and Storage

A. Handling : Use only with adequate ventilation. Keep away from heat, sparks and flame.

Avoid breathing vapor.

Wash thoroughly after handling.

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Avoid direct physical contact.

Avoid contact with incompatible materials.

Refer to Engineering controls and personal protective equipment.

Handling only authorized person.

B. Storage : Store and use with adequate ventilation.

There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Avoid the oxidizing agent.

Save applicable laws and regulations.

Avoid direct sunlight.

Keep in the original container.

Prevent static electricity and keep away from combustible materials or heat sources.

Collected them in sealed containers.

Store away from water and sewer.

8. Exposure Controls / Personal Protection

A. Exposure limit value :

1) ACGIH :

- TLV-TWA : 500ppm Simple Asphyxiant

- TLV-STEL : -


2) OSHA : Not available

B. Engineering control : Adequate ventilation(localize ventilation) should be provided in workplaces. Use non sparking tools.

A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. The use of local exhaust ventilation is recommended to control emissions near the source.

C. Personal protective equipment

1) Respiratory protection : If required to control exposure, use only suitable respirators and components tested and approved under appropriate government standards such as NIOSH.

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Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.

Respiratory protection is ranked in order from minimum to maximum.

Consider warning properties before use.

Any chemical cartridge respirator with organic vapor cartridge(s).

Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).

Any air-purifying respirator with a full facepiece and an organic vapor canister.

For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

- 2) Eye protection - Wear approved chemical safety glasses or goggles where eye exposure is reasonably probable.


Eye wash fountain is recommended.

- 3) Hand protection - Wear protective gloves. Butyl rubber gloves are recommended.

- 4) Skin / Body protection - Wear appropriate chemical resistant protective clothing.

9. Physical and Chemical Properties

- A. Appearance(physical state, color etc.) : colorless gas
- B. Odor : characteristic smell
- C. Odor Threshold : between 39.6 and 116.27 mg/cu m
- D. pH : not applicable
- E. Melting point/Freezing point : -185°C
- F. Boiling point/range : -47°C
- G. Flash point : -107°C
- H. Evaporation rate : Not available
- I. Flammability (solid, liquid): Flammable Gas
- J. Flammability Limit (lower/upper) : 2.4% ~ 10.3%
- K. Vapor pressure : 8690mmHg(@25°C)
- L. Solubility in water : 200mg/l(@25°C)
- M. Vapor density(Air=1) : 1.5

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| N. Specific gravity : 0.5  | Material Safety Data Sheet | | Creation | 2009.11.25 |
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O. Partition Coefficient(n-Octanol/water) : 1.77 (= log Pow)

P. Auto-ignition temperature : 460°C

Q. Thermal decomposition : Not available

R. Viscosity : 0.140cP@-40°C

S. Molecular weight : 42.06

10. Stability and Reactivity

A. Stability : high-pressure gas; May explode when heated.

May form explosive mixture.

B. Possibility of hazardous reaction : May occur.

C. Conditions to avoid : Ignition source, excess heat, confined spaces.

Avoid contact with incompatible materials and condition.

D. Incompatible material :

Oxidizing agent, halogen, acid, ammonium hydroxide.

Reacts violently with strong oxidisers, trifluoromethyl hypofluorite, fluorine, chlorine and many other compounds

Is incompatible with ammonium hydroxide

Forms explosive mixtures with nitrogen oxide compounds.

May accumulate static charges which may ignite vapour.

The various oxides of nitrogen and peroxyacids may be dangerously reactive in the presence of alkenes. BREITHERICK L.: Handbook of Reactive Chemical Hazards

Avoid reaction with strong Lewis or mineral acids.

Reaction with halogens requires carefully controlled conditions.

E. Hazardous decomposition products : Hydrocarbon compounds, Carbon oxides(carbon monoxide (CO), carbon dioxide (CO₂))

11. Toxicological Information


A. Route of exposure

1) Inhalation : May cause drowsiness and dizziness.

2) Ingestion : Not available

3) Skin contact : Not available

4) Eye contact : Not available

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B. Delayed and immediate effects and also chronic effects from short and long term exposure

1) Acute toxicity :

- Oral : Not available
- Dermal : Not available
- Inhalation : gas LC50 = 658 mg/ℓ 4 hr Rat

2) Skin corrosion/irritation : No irritation to human

3) Serious eye damage/irritation : Causes mild irritation to human.

4) Respiratory sensitization : Not available

5) Skin sensitization : Not available

6) Carcinogenicity :

- MOL Notice : Not available
- OSHA : Not available
- NTP : Not available
- IARC(GROUP) : 3
- ACGIH : A4
- EC : Not available

7) Germ cell mutagenicity :

- Microorganism AMES test : negative

8) Reproductive toxicity : Not available

9) STOT-single exposure : It may cause effects for central nervous system and decrease in consciousness to exposure.

10) STOT-repeated exposure : Side effects for 14-week inhalation repeated-exposure toxicity with propylene 1000 ppm were not observed.

11) Aspiration hazard : Not available


12. Ecological Information

A. Ecotoxicity :

- 1) Fishes : Not available
- 2) Crustacea : Not available
- 3) Seaweeds : Not available

B. Persistence and Degradability :

- 1) Persistence : log kow 1.77
- 2) Degradability : Not available

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C. Bioaccumulation potential :

1) Biodegradation : Biodegradability = 65.7 (%) 35 day
2) Bioaccumulation : BCF 13.18

D. Mobility in soil : Koc 220

E. Hazardous to the ozone layer : Not classified

F. Other adverse effects : Not available

13. Disposal Consideration

A. Disposal method : Dispose in accordance with all applicable regulations.
Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.
If water separation is possible, pre-process with Water separation process.

B. Disposal instruction : The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
Dispose of waste in accordance with all applicable laws and regulations.

C. Waste code : Not available

14. Transportation Information

A. UN classification : UN1077

B. Proper shipping name : propylene

C. Class/division : 2.1

D. Packing group : -

E. Marine pollutant : Not applicable

F. Special precautions for user related to transport or transportation measures

- ☐ Local transport follows in accordance with Dangerous goods Safety Management Law.
- ☐ Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-D (Flammable gases)
- EmS SPILLAGE SCHEDULE : S-U (Gases (flammable, toxic or corrosive))



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15. Regulatory Information

A. Additional national and/or international regulatory information

- ☐ Information of EU Classification :
 - Classification :
 - [1-Propene] : F+; R12
 - Risk Phrases :
 - [1-Propene] : R12
 - Safety Phrase :
 - [1-Propene] : S2, S9, S16, S33
- ☐ U.S. Federal regulations :
 - OSHA PROCESS SAFETY (29CFR1910.119) : Not available
 - CERCLA Section 103 (40CFR302.4) : Not available
 - EPCRA Section 302 (40CFR355.30) : Not available
 - EPCRA Section 304 (40CFR355.40) : Not available
 - EPCRA Section 313 (40CFR372.65) :
 - [1-Propene] Applicable
- ☐ Rotterdam Convention listed ingredients : Not available
- ☐ Stockholm Convention listed ingredients : Not available
- ☐ Montreal Protocol listed ingredients : Not available

16. Other Information

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability on completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

A. Issue date : 2009.11.25

B. Last revision : 2022.04.01, Rev 3.

- Rev.3 : Change company name and logo