SHOWA DENKO K.K.

GPS/JIPS Safety Summary

1. SUBSTANCE NAME

Propylene (CAS No.: 115-07-1)

2. GENERAL STATEMENT

Propylene is a source material for producing polypropylene, from which automotive components, packaging films, food containers, trays, medical utensils and other plastic products that are often encountered in our daily lives have been made. The substance takes the form of a clear gas under normal temperatures, and possesses a slight aroma. It is a typical basic petrochemical product produced together with ethylene, by thermally decomposing naphtha made from crude oil at temperatures of 800°C or higher. As an organic compound with a double bond, it is used as a basic source material for polypropylene, acrylonitrile, acrylic acid and other propylene products.
On the other hand, the gas is extremely combustible and flammable. As such, it is important to keep it away from heat, sparks, open flames and other fire sources. Additionally, note that its inhalation could induce drowsiness and dizziness.

3. CHEMICAL IDENTITY

Item	Description
Chemical or generic name	Propylene
Product name	Propylene
CAS No.	115-07-1 (IUPAC : prop-1-ene)
Other Nos.	Japan: Chemical Substances Control Law (2)-13 EC No.: 204-062-1
Chemical formula	C_3H_6
Structural formula	CH_2=CH-CH_3
Sources/references	Sections 3 and 16 of the SDS issued by SHOWA DENKO K.K.

4. USES AND APPLICATIONS

Main uses	The substance is used as a source material for polypropylene, acrylonitrile, acrylic acid, propylene oxide and other petrochemical products. As a synthetic resin possessing many excellent properties, such as being light-weight and high in workability, durability, heat resistance and chemical resistance, polypropylene is used widely as material for automotive bumpers, instrument panels, food trays, home appliances, medical apparatuses, etc.

5. PHYSICAL/CHEMICAL PROPERTIES

The substance takes the form of a clear gas under normal temperatures, and possesses a slight, peculiar odor. Since the gas is extremely combustible and flammable, it is important to it keep away from heat, sparks, open flames and other fire sources.

Appearance	Gas(combustible and flammable)
Color	Colorless
Odor	Slightly, sweetish
Melting point/boiling point	-185.2 ºC /-47.7 ºC
Flash point	-107.8 ºC
Lower and upper Flammability limits	2.0 to 11.1 vol%
Auto-ignition temperature	480 ºC
Vapor pressure	1040 kPa・abs(21.1 ºC)
Vapor density	1.48(Air=1)
Density	0.975 (Air=1)(0.101MPa・abs 0 ºC)
Solubility in water	22.05cm^3/100cm^3 H_2O (0.101MPa・abs 20 ºC)
Partition coefficient (n-octanol/water)	Log Kow: 1.77
Specific volume	0.567m^3/Kg (0.101MPa・abs 21.1 °C)
Sources/references	Section 9 of the SDS issued by SHOWA DENKO K.K.

6. HEALTH EFFECTS

When inhaled, the gas could induce drowsiness and dizziness.

Effect assessment	Results (GHS(Note 1) hazard classification)
Acute toxicity (oral)	Classification not possible (Note 4)
Acute toxicity (dermal)	Classification not possible
Acute toxicity (Inhalation : gases)	Not classified (Note 3)
Acute toxicity (Inhalation : vapors)	Not applicable (Note 2)
Acute toxicity (Inhalation : dusts and mists)	Not applicable
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	Not classified
Reproductive toxicity	Classification not possible
Specific target organ toxicity (single exposure)	Category 3 (narcotic effect)
Specific target organ toxicity (repeated exposure)	Not classified
Aspiration hazard	Not applicable
Sources/references	Sections 2, 11 of the SDS issued by SHOWA DENKO K. K.

(Note 1) GHS (Globally Harmonized System of Classification and Labeling of Chemicals): It is a system for classifying chemicals according to type and hazard level, and for indicating label information pursuant to the globally unified rules for offering Safety Data Sheets.
(Note 2) Not applicable: when chemicals do not fall within the scope of classification because the physical properties defined in the GHS do not apply.
(Note 3) Not classified: when the hazards are believed to be less than even the lowest hazard

classification defined in the GHS.
(Note 4) Classification not possible: when unable to classify due to a lack of sufficiently reliable data for defining the classification.

7. ENVIRONMENTAL EFFECTS

Effect assessment	Results (GHS hazard classification)
Hazardous to the aquatic environment	
Acute hazard	Classification not possible
Long-term hazard	Classification not possible
Hazardous to the ozone layer	Montreal Protocol on Substances that Deplete the Ozone Layer (revised version): not included in the list.
Sources/references	Sections 2 and 12 of the SDS issued by SHOWA DENKO K.K.

Environmental fate/dynamics	Results
Mobility in soil	No reliable data available.
Persistence/degradability	No reliable data available. However, the substance is presumed to be readily biodegradable in air.
Bioaccumulation potential	Bioaccumulation potential is presumed to be low.
Conclusion about PBT/vPvB	The criteria for persistent bioaccumulative and toxic (PBT; remaining persistently in the environment and possessing high bioaccumulation potential and toxicity) and very persistent and very bioaccumulative (vPvB; remaining very persistently in the environment and possessing very high bioaccumulation potential) chemicals are believed to inapplicable.
Sources/references	none

8. EXPOSURE

	Exposure potentials through main uses
Occupational exposures	Since the company's product is produced in a closed process, the potential for occupational exposure is extremely limited. Polypropylene, propylene oxide and other products made from the substance are manufactured in closed processing systems. As such, exposure to workers who manufacture polypropylene and propylene oxide, etc., is extremely limited. However, workers could inhale the substance, or their skin and eyes could come in direct contact with it when sampling, etc.
Consumer exposures	The substance is not used in any case by general consumers.
Environmental exposures	Since the substance is normally manufactured and used in a closed process, its emission into the environment is extremely limited. The substance exists in the form of gas under normal temperatures and pressures, and is believed to be dispersed in the air when discharged into the environment. Further, the substance could be promptly decomposed in the air.

Precautions	If there is the potential for exposure during use in other applications, please implement appropriate measures by referring to the risk management recommendations.

9. RISK MANAGEMENT RECOMMENDATIONS

No specific influences on human health have been reported, but it is required to prevent inhalation and dermal exposure when sampling the substance. For that prevention, it is recommended to wear appropriate protective masks, and clothes and protective gloves made of materials impermeable to propylene.
Although no influences on the environmental life have been reported, preventive measures against leakage are recommended.

	Risk management recommendations
Occupational exposures	Wear appropriate protective masks, as well as clothes and protective gloves made of materials impermeable to propylene, when sampling the substance. The American Conference of Governmental Industrial Hygienists (ACGIH) has published the occupational threshold limit value of 500 ppm (time-weighted average; TWA) for this substance. Therefore, in manufacturing places or places using the substance, it is required to manage and control an environmental concentration of the substance to keep it below the threshold limit value. Managers responsible for processes should educate workers on the selection of appropriate protective gear, their proper usage and how to manage their working places.
Consumer exposures	The substance is not used by general consumers.
Environmental exposures	The substance could affect the environment if leaked. Therefore, implement preventive measures against leakage and pay attention to the daily management and handling of the substance.
Special instructions	・ Keep away from heat, sparks, open flames, high-temperature objects and other fire sources, because the substance is extremely combustible and flammable. ・ Wear conductive shoes that prevent static electricity while at work. ・ When ethylene manufacturing facilities are open (for regular repair, etc.), oxygen shortage could result when the atmospheric concentration of ethylene is high. Measure the oxygen concentration before entering the area, and wear appropriate protective gear as necessary.
Sources/references	Sections 4, 5, 6, 7, 8, 13 and 14 of the SDS issued by SHOWA DENKO K.K.

10. STATE AGENCY REVIEW

Hazard assessment	Situations of review
International Chemical Safety Cards	http://www.inchem.org/documents/icsc/icsc/eics0559.htm
OECD HPV	http://webnet.oecd.org/hpv/UI/handler.axd?id=b6a131d2-312f-414c-8a2e-426ad5c1b1de

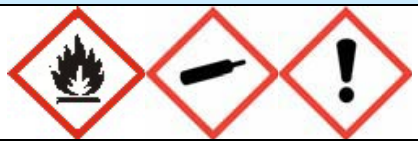
REACH	http://apps.echa.europa.eu/registered/data/dossiers/DISS-9c7a7763-21fa-60b3-e044-00144f67d249/AGGR-3a476d0a-cd32-4da4-86ba-7fcdfba9be43_DISS-9c7a7763-21fa-60b3-e044-00144f67d249.html

11. REGULATORY INFORMATION/GHS CLASSIFICATION-LABELING INFORMATION

Regulatory information only in Japan

Applicable laws	Regulatory situations
Industrial Safety and Health Act	・Hazardous substances, inflammable substances, item 5, Appended Table 1 of the Enforcement Ordinance
High Pressure Gas Safety Act	・Liquefied gas, Article 2-3 of the Act ・Inflammable gas, Article 2-1 of Regulations for Safety Precautions for High-Pressure Gas
Ship Safety Act	Compressed gas, Appended Table 1 specifying the hazardous substances, Article 3 of Regulations for the Carriage and Storage of Dangerous Goods in Ship
Civil Aeronautics Act	Pressurized gases, Appended Table 1 specifying the hazardous substances, Article 194 of the Enforcement Regulations
Act on Port Regulations	Hazardous substances・Compressed gas , Article 21-2 of the Act, Article 12 of Enforcement Regulations
Road Act	・Restrictions on vehicle traffic, Article 19-13 of the Enforcement Ordinance, Appended Table 2 of Notification No.12 of Japan Expressway Holding and Debt Repayment Agency
Foreign Exchange and Foreign Trade Act	・Item (2), Appended Table 1-16 of Export Trade Control Order
UN classification	Class 2.1
UN No.	UN1075 “PETROLEUM GASES, LIQUEFIED” UN1077 “PROPYLENE”

GHS classification, label information

Hazards	Classification results (hazard information)
Physical chemical hazards	
Flammable gases	Category 1
Gases under Pressure	Liquefied gas
Health hazards	
Specific target organ toxicity (single exposure)	Category 3 (narcotic effect)
GHS label elements	
Pictogram or symbol	
Signal word	Danger
Hazard statement	Extremely flammable gas Contains gas under pressure; may explode if heated May cause drowsiness or dizziness

12. CONTACT INFORMATION

Company name	SHOWA DENKO K.K.
Address	13-9, Shiba Daimon 1-chome, Minato-ku, Tokyo 105-8518 , Japan
Department	Olefins Department, Petrochemicals Division
Telephone, fax	+81-3-5470-3752/+81-3-3437-6647

13. DATE OF ISSUE AND REVISION, ADDITIONAL INFORMATION

Date of issue: September 27, 2013
Revisions:

Date of revision	Revised section	Revised item	Version

Special instructions: none

14. DISCLAIMER

This Safety Summary which is a translation of original Safety Summary prepared in Japanese, has been prepared as a part of the efforts by GPS/JIPS: Japan Initiative of Product Stewardship by the chemical industry. This Safety Summary is meant to provide an outline of information related to the safe handling of the subject substance rather than provide expert information regarding the risk assessment processes, the effect on human health or the environment, etc. Moreover it is not a replacement for the Safety Data Sheet (SDS), the Chemical Safety Report (CSR), or other risk assessment documents. To the greatest extent possible, the Safety Summary contains accurate statements based on laws, materials, information and other data available at the time of issue. However, it does not cover all such data. Additionally, it does not intend to provide a guarantee in any way.