Extended Safety Data Sheet

Issue date: 06/12/2021 **Version 2.0**

Revision date: 07/12/2021 **SMDS Record Number: CSSS-TCO-010-124011**

Section 1 Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:

Identification on the label/Trade name: propylene glycol

Additional identification: MPG

Identification of the product: CAS#: 57-55-6; EC# : 200-338-0

Index Number: Not available

1.2 Relevant identified uses of the substance and uses advised against:

1.2.1 Identified uses:

Manufacturing of the substance

Distribution of substance

Formulation & (re) packing of substances and mixtures

Polymer production

Laboratory agents

Water treatment chemicals

Use as binders and release agents

Uses in Coatings

Use in cleaning Agents

Functional Fluids

Rubber production and processing

Water treatment chemicals

Mining chemicals

Polymer production

De-icing and anti-icing applications

Agrochemical uses

Fuel use - Professsional

Other consumer Uses

1.2.2 Uses advised against:

Use in artificial (theater) fog

Use in electronic cigarettes and artificial (theater) fog

1.3 Details of the supplier of the safety data sheet:

Supplier(Manufacturer): SHANDONG AIVK CHEMICAL CO., LTD

Address: Economic Development Zone,Guangrao Country, Dongying City,Shandong,China

Contact person(E-mail): sunny@aivkchem.com

Telephone: +86-546-6440079

1.4 Emergency telephone Number:

Available outside office hours? YES [ ] NO [X]

Section 2 Hazards Identification

2.1 Classification of the substance/mixture

2.1.1 Classification:

The substance is not classified according to REGULATION (EC) No 1272/2008:

2.2 label elements

Hazard Pictograms: No

Hazard Statement: No

Precautionary statement No

2.3 Other hazards

Not available.

Section 3 Composition/information on ingredients

Substance/Mixture: Substance

Ingredient(s):

Chemical Name	CAS No.	EC No.	Concentration
propylene glycol	57-55-6	200-338-0	>99. 9%(w/w)
Unknown impurities	N/A	N/A	<0.1%(w/w)

Section 4 First aid measures

4.1 Description of first aid measures:

In all cases of doubt, or when symptoms persist, seek medical attention.

4.1.1 In case of inhalation:

-Not expected to be an inhalation hazard under anticipated conditions of normal use of this material.
-Avoid inhalation of hot vapors or extremely high concentrations of aerosols
-Remove to fresh air.
-Consult a physician if necessary.
Skin contact:
-Wash skin with plenty of water

4.1.2 In case of skin contact:

Wash skin with plenty of water

4.1.3 In case of eyes contact:

- Flush eyes with water thoroughly and continuously for 15 minutes.
- Remove contact lenses, if present and easy to do.
- If irritation persists get medical advice/attention...

4.1.4 In case of ingestion:

Not expected to present a significant ingestion hazard under anticipated conditions of normal use.

4.2 Most important symptoms and effects, both acute and delayed

None.

4.3 Indication of any immediate medical attention and special treatment needed

None.

Section 5 Fire-Fighting measures

5.1 Extinguishing media:

- SMALL FIRE: Use dry chemicals, CO_2, water spray or alcohol-resistant foam.
- LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.

5.2 Special hazards arising from the substance or mixture

- Heat from fire can generate flammable vapor.
- When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined.
- Vapors may be heavier than air. May travel long distances along the ground before igniting and flashing back to vapor source.
- Fine sprays/mists may be combustible at temperatures below normal flash point.
- Fight fire from a safe distance/protected location.
- Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries.
- Use water spray/fog for cooling. Avoid frothing/steam explosion. Burning liquid may float on water.
- Although water soluble, may not be practical to extinguish fire by water dilution.
- Notify authorities immediately if liquid enters sewer/public waters.

5.3 Advice for fire-fighters:

- In the event of fire, wear self-contained breathing apparatus.

Section 6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

6.1.1 For non-emergency personnel:

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

6.1.2 For emergency responders:

Wear an appropriate NIOSH/MSHA approved respirator if mist, vapor or dust is generated.

6.2 Environmental Precautions:

Try to prevent the material from entering drains or water courses.

6.3 Methods for Containment and Cleaning up:

- Extinguish all ignition sources.
- Stop release; prevent flow to sewers/public waters.
- Notify fire and environmental authorities.
- Impound/recover large land spill; soak up small spill with inert solids.
- Soak up small spills with inert solids.
- Use suitable disposal containers.
- On water, material is soluble and may float or sink.
- Contain/collect rapidly to minimize

6.4 Reference to other sections:

See Section 7 for information on safe handling.

See section 8 for information on personal protection equipment.

See Section 13 for information on disposal.

6.5 Additional information:

Not applicable.

Section 7 Handling and storage

7.1 Precautions for safe handling:

7.1.1 Protective measures:

-No special ventilation is recommended under anticipated conditions of normal use beyond that needed for normal comfort control.

7.1.2 Advice on general occupational hygiene:

-Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use.

- Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- Use good personal hygiene practices.
- Wash hands before breaks and at the end of workday.

7.2 Conditions for safe storage, including any incompatibilities:

- Keep container tightly closed.
- Protect from moisture.
- Store away from heat.
- Material can attack some forms of plastics.
- Do not store together with oxidizing and self-igniting products. Protect from air. Protect contents from the effects of light. Containers should be stored tightly sealed in a dry place. Protect against heat.

7.3 Specific end use(s):

Not applicable.

Section 8 Exposure Controls/Personal Protection

8.1 Control parameters:

8.1.1 Occupational exposure limits: Not available

8.1.2 Additional exposure limits under the conditions of use: Not available

8.1.3 DNEL/DMEL and PNEC-Values:

DN(M)ELs for workers

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
Inhalation	Systemic effects-Long-term	DNEL (Derived No Effect Level) 168mg/m³	repeated dose toxicity (By inhalation)
Inhalation	Systemic effects - Acute	no hazard identified	

Inhalation	Local effects - Long-term	DNEL (Derived No Effect Level) 10mg/m³	repeated dose toxicity
Inhalation	Local effects - Acute	no hazard identified	
Dermal	Systemic effects - Long-term	no hazard identified	
Dermal	Systemic effects - Acute	no hazard identified	
Dermal	Local effects - Long-term	no hazard identified	
Dermal	Local effects - Acute	no hazard identified	
Eyes	Local effects	no hazard identified	

DN(M)ELs for the general population

Route	**Type of effect**	**Hazard conclusion**	**Most sensitive endpoint**
Inhalation	Systemic effects - Long-term	DNEL (Derived No Effect Level) 50mg/m³	repeated dose toxicity (By inhalation)
Inhalation	Systemic effects - Acute	no hazard identified	
Inhalation	Local effects - Long-term	DNEL (Derived No Effect Level) 10mg/m³	repeated dose toxicity
Inhalation	Local effects - Acute	no hazard identified	
Dermal	Systemic effects - Long-term	no hazard identified	
Dermal	Systemic effects - Acute	no hazard identified	
Dermal	Local effects - Long-term	no hazard identified	
Dermal	Local effects - Acute	no hazard identified	
Oral	Systemic effects - Long-term	no hazard identified	
Oral	Systemic effects - Acute	no hazard identified	
Eyes	Local effects	no hazard identified	

PNEC

Compartment	**Hazard conclusion**	**Remarks/Justification**
Freshwater	PNEC aqua (freshwater): 260mg/L Intermittent releases: 183mg/L	Assessment factor: 50 Extrapolation method: assessment factor PNEC intermittent release hazard assessment conclusion: PNEC intermittent release assessment factor: PNEC intermittent release extrapolation method: PNEC intermittent release justification:

Marine water	PNEC aqua (marine water): 26mg/L Intermittent releases:	Assessment factor: 500 Extrapolation method: assessment factor Three short-term L(E)C50 of each trophic levels (fish, invertebrates and algae) and two long-term NOEC from two trophic levels (invertebrates and algae) are available. An assessment factor of 500 is applied to the lowest no effect concentration (7-d NOEC = 13020 mg/l) for the freshwater invertebrate Ceriodaphnia.
Sediments (freshwater)	PNEC sediment (freshwater): 572mg/kg sediment dw	Assessment factor: Extrapolation method: equilibrium partitioning method The equilibrium partitioning method was used using a Koc value of 2.9 l/kg. The PNECsed is 220 mg/kg wet weight. This was multiplied with a factor 2.6 based on the default water content of sediment.
Sediments (marine water)	PNEC sediment (marine water): 57.2mg/kg sediment dw	Assessment factor: Extrapolation method: equilibrium partitioning method The equilibrium partitioning method was used using a Koc value of 2.9 l/kg. The PNEC marine sediment is 22 mg/kg wet weight. This was multiplied with a factor 2.6 based on the default water content of sediment.
Sewage treatment plant	PNEC STP: 20000mg/	Assessment factor: 1 Extrapolation method: assessment factor 18-h NOEC is >20,000 mg/l in a growth inhibition test with Pseudomonas putida
Soil	PNEC soil: 50mg/kg soil dw	Assessment factor: Extrapolation method: equilibrium partitioning method The equilibrium partitioning method was used using a Koc value of 2.9 l/kg. The PNECsoil is 44 mg/kg wet weight. This was multiplied with a factor 1.13 based on the default water content of soil. on an assumed average wet weight for soil.
Air	no hazard identified:	
Secondary	no potential for	Assessment factor:

8.2 Exposure controls

8.2.1Appropriate engineering controls:

-No special ventilation is recommended under anticipated conditions of normal use beyond that needed for normal comfort control.

8.2.2 Individual protection measures, such as personal protective equipment:

Eye/face protection - Safety glasses with side shields are recommended.

Hand protection -Not normally considered a skin hazard.

-If protective gloves are used, the glove material must be resistant to the substance.

Glove material for example, Nitrile rubber/Nitrile latex (NBR); GESTIS substance database

(hazardous substance information system of commercial professional associations).

Body protection - No special clothing/skin protection equipment is recommended under normal conditions of anticipated use.

- Where use can result in skin contact, practice good personal hygiene.

Respiratory protection - No personal respiratory protective equipment normally required.
- In an emergency, use supplied air or a self-contained breathing apparatus containing air,

operated in positive pressure mode which has been recommended or approved by an

appropriate agency.

Thermal hazards Not available

8.2.3 Environmental exposure controls:

Not applicable

Section 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties
Appearance liquid
Melting/Freezing point/range (°C): < -20 °C at 101.325 Pa

Boiling point/range (°C): 184 °C at 100.32 kPa

Flash point (°C): 104 °C at 100.01 kPa

Self-ignition temperature: > 400 °C at 100.01-101.44 kPa

Vapour pressure (25°C): 20 Pa

Relative Density: 1.03 at 20 °C

Water solubility (g/l): 100 vol% at 20 °C

n-Octanol/Water (log Po/w): -1.07 at 20.5 °C

Viscosity: 43.4 mPa×s at 25 ˚C

Surface tension: 71.6 mN/m at 21.5 °C for a 1.01 g/L solution.

Dissociation constant in water(pKa): Not applicable

9.2. Other information:

Explosive properties : Non explosive

Flammability: not flammable.

Oxidizing properties : no oxidizing properties

Granulometry : Not applicable

Stability in organic solvents and identity of

relevant degradation products :
Not applicable

Section 10 Stability and reactivity

10.1 Reactivity:

-Stable under normal temperatures and pressures.

10.2 Chemical stability:

- The test substance appeared to be stable under the conditions of the study; no evidence of instability was observed. - Haskell number: 28464

10.3 Possibility of hazardous reactions:
- Carbon Monoxide and other toxic vapors.
- Note: This material is stable when properly handled and stored.

10.4 Conditions to avoid:

- High temperatures, oxidizing conditions.

10.5 Incompatible materials:

-Strong acids, Isocyanates, strong oxidizing agents.

10.6 Hazardous decomposition products:

- Note: Thermal decomposition may produce carbon monoxide and other toxic vapors.

Section 11 Toxicological information

11.1 Toxicokinetics, metabolism and distribution

The following information is taken into account for any hazard / risk assessment:

Value used for CSA:

Bioaccumulation potential: no bioaccumulation potential Absorption rate - oral (%): Absorption rate - dermal (%): 40 Absorption rate - inhalation (%): 100

Additional information:

Oral absorption

Toxicokinetic behavior of monopropylene glycol and its structural homologue tripropylene glycol upon oral administration to rats was investigated in a well-conducted and well-reported study (Dow Chemical Company, 1995). In this study, two groups of 5 male rats were administered a single oral dose of either radiolabeled (14 C) tripropylene glycol or non-radiolabeled monopropylene glycol by gavage in water at target concentrations 40 mg/kg bw and 50 mg/ kg bw, respectively. The excreta were collected for ca. 24 hours post-dosing. After sacrifice 24 hours post-dosing the remaining radioactivity in tissues was determined for the first group and urine was analyzed for free and acidabile conjugates of mono-, di- and tripropylene glycol for both groups. While the absorption of monopropylene glycol has not been specifically investigated in the study, the data on tripropylene glycol indicate that it is rapidly adsorbed if administered by gavage, based on the average recovery of ca. 91% of the 14 C label administered from excreta, CO 2 , skin, tissues and carcass after ca. 24 hours post-dosing sacrifice. The absorption of tripropylene glycol via oral route was calculated to amount to at least 86%, based on 5% of the ad ministered dose recovered in faeces. As monopropropylene glycol has a significantly lower molecular weight, its absorption from the gut is expected to occur even faster. Toxicokinetic behavior of monopropylene glycol in humans and experimental animals was also evaluated by the NTP CERHR expert panel (National Toxicology Program, 2004a), which concluded that available data indicate rapid and extensive absorption. Therefore a value of 100% for or al absorption shall be used for risk assessment for monopropylene glycol.

Distribution

No data on the distribution of monopropylene glycol were reported in the study; however, in case of tripropylene glycol, approximately 10% of the radiolabeled dose was recovered in tissues and carcass, with the liver and kidney having the greatest amount of radiolabel per gram of tissue 24 hours after dosing (ca. 0.2 and 0.1%, respectively). The 14 C concentration in blood was approximately 6.4 and 2.8 -fold lower than in liver and kidney, respectively. The expert panel of NTP CERHR (National Toxicology Program, 2004a) concluded that monopropyle ne glycol is rapidly distributed into total body water.

Metabolism and excretion

In the study with rats administered monopropylene glycol and radiolabeled tripropylene glycol, the data on the animals administered monopropylene glycol indicate that approximately 11% of the monopropylene glycol administered was recovered in the urine as free monopropylene glycol with < 1% of the dose recovered as acid-labile conjugates. In the stud y with radiolabeld tripropylene glycol, twenty-four hours after administration of a single oral dose of 40 mg/kg bw to male rats, only 5.8% of the dose was recovered as unmetabolized parent compound in the urine, while 7.2% was recovered as acid-labile conjugates of tripropylene glycol, 5.1% and 3.3% as free and acid-labile conjugates of dipropylene glycol and 3.3% and 0.6% as free and acid-labile conjugates of monopropylene glycol, respectively. A large fraction (21%) of the 14 C-tripropylene glycol dose was catabolized all the way to 14 CO 2 , indicating considerable break down of tripropylene glycol.

According to the NTP CERHR expert panel report (National Toxicology Program, 2004a), the rate determining step in the metabolism is alcohol dehydrogenase which, when saturated, switches from a first order process into a zero order process. Saturation of metabolism appears to occur in rats and rabbits at a dose of about 1600 to 2000 mg/kg bw, whereas in humans this seems to happen at a dose of about 200 mg/kg bw. In accordance with a zero order process, the half-life of propylene glycol in humans and rats increases from about 1.5 hours to more than 5 hours with increasing doses above metabolic saturation. By a NAD-dependent reaction, alcohol dehydrogenase converts propylene glycol to lactaldehyde, which is further metabolized to lactate. Since propylene glycol has a chiral center, technical grade propylene glycol results in the formation of 50/50 D, L-lactate. L-lactate is indistinguishable from endogenous lactate, which is a good substrate for gluconeogenesis. D-lactate is less readily converted to glucose than L-lactate, which prolongs its half-life leading, under conditions of prolonged exposure, to D-lactic acidosis. It is difficult to cause Llactic acidosis even with very high doses of propylene glycol because of its efficient detoxification via gluconeogenesis. The second reason for lack of development of L-lactic acidosis is the saturation of alcohol dehydrogenase, which results in a constant rate of lactate production. Due to removal of Llactate by gluconeogenesis, a further increase in

lactate levels is not possible after saturation of metabolism. The excretion of propylene glycol is species-dependent. Humans clear about 45% of propylene glycol via kidney, and in dogs, up to 88%. In rats and rabbits, very little of the parent compound is excreted by the kidney until saturation of metabolism occurs. Inhibition of alcohol dehydrogenase by pyrazole increases urinary excretion of propylene glycol to 75% in rats, as expected. Since propylene glycol has very low intrinsic toxicity, saturation of metabolism plays a protective role in its toxicity since the conversion of propylene glycol to the more toxic lactate (particularly D-lactate) is slowed.

Inhalation route of exposure

Only limited data addressing the absorption of monopropylene glycol by inhalation are available. Bau et al. (1971) reported that less than 5% of a technetium-labeled aerosol containing 10% monopropylene glycol in deionized water was taken up by human volunteers after inhalation for 1 hour in a mist tent. The authors measured the aerosol mass median diameter to be 4.8 -5.4 microns, a size small enough to have enabl ed penetration to the deep lung. Ninety percent of the dose was found in the nasopharynx and it rapidly entered the stomach with very little entering the lungs. Monopropylene glycol was not directly measured, not allowing th e determination of absorption through the nasal mucosa. However, the low dose rate from inhalation exposure and the small surface area would not lead to significant absorption of monopropylene glycol.

Dermal route of exposure .

An in vitro skin penetration study (El du Pont de Nemours and Company, 2007 ; Fasano et al, 2011) with the monopropylene glycol, using human cadaver skin and per formed under infinite dose conditions, was available for assessment. A nominal dose of 120 0 µL/cm 2 (ca. 1.2 g/cm 2)of the neat substance was applied for 24 hours under occlusive conditions t o 6 skin replicates representing 5 human subjects. By the conclusion of the 24-hour exposure inter val, only a negligible portion of the applied dose of neat monopropylene glycol (0.14%) had penetrate d through the skin into the receptor fluid. The integrity of human ski n, as determined by electrical impendance (EI), was affected by continuous exposure to monopropylene glycol under occlusive conditions. The ratio of the post-EI values was 0.33, confirming that the barrier properties of the stratum corneum were altered by monopropylene glycol. In general, monopropylene glycol was detected in receptor fluid within about an hour of application (lag time ~ 6 hours); steady-state penetration, which was represented by no less than 4 data points, was determined to be 95.4 µ g/cm 2 /h (r 2⩾0 .999).This represents the maximum flux for neat monopropylene glycol. Based on the slope at steady-state (95.4 µ g/cm 2 /h) and the concentration of monopropylene glycol in the applied solution, taken as its density (1,036,000 µ g/cm 3), the permeability coefficient for neat monopropylene glycol was calculated to be 9.21×10 -5 cm/h. Based on the results of the study, a value of 40% for dermal ab sorption has been chosen by expert judgment to be used in the risk assessment. This value has been chosen as an average value between the percentage of dermal absorption obtained in the study and the maximal oral absorption (corresponding to 100%), and is considered to represent a worst -case approach. .

Discussion of human information: See “Summary and discussion of human information” in chapter 5 HUMAN HEALTH HAZARD ASSESSMENT

11.2 Information on toxicological effects

Acute toxicity:

LD50(Oral, Rat): 22 000 mg/kg bw

LD50(Dermal, Rabbit): > 2000 mg/kg bw

LC50(Inhalation, Rabbit): > 317042 mg/m³ air

Skin corrosion/Irritation: Not classified

Serious eye damage/irritation: Not classified

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Negative

Carcinogenicity: Not classified

Reproductive toxicity: Not classified

STOT- single exposure: Not classified

STOT-repeated exposure: Not classified

Aspiration hazard: Not classified

Section 12 Ecological information

Toxicity:

Acute toxicity Time Species Method Remarks
LC50 40613
mg/L

96h Fish Environment Canada (1990) 2 (reliable with restrictions) key

study experimental study Test

material

EC50 43500mg/L 48h Daphnia OECD Guideline 202 (Daphnia

sp. Acute Immobilization Test)

1 (reliable without restriction)

supporting study experimental study

Test material 1,2-Propanediol /

57-55-6 / 200-3380 (see Annex 2 for

more information), Form: Reference

ARCO Chemical Company 1990

EC50 24200
mg/L

72h Algae OECD Guideline 201 (Alga,

Growth Inhibition Test)

1 (reliable without restriction) key

study experimental study Test

Material
propylene glycol**/ 57-55-6 /**

200-3380 (see Annex 2 for more

information), Form: Reference

ARCO Chemical Company 199

Persistence and degradability: Readily biodegradable

Bioaccumulative potential:

Thus, based on the BCF relevant accumulation of the substance in organisms is not expected.

Mobility in soil: Not available.

Results of PBT&vPvB assessment: The substance is not considered a PBT/vPvB.

Other adverse effects: Not available

Section 13 Disposal considerations

13.1 Waste treatment methods

- Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

- Do not dispose of waste into sewer.

- Do not contaminate ponds, waterways or ditches with chemical or used container.
- Dispose of in compliance with respective national and local regulations

13.2 Product / Packaging disposal:

-Empty containers should be taken to an approved waste handling site for recycling or disposal.

Section 14 Transport information **Sea transport (IMDG)**

Land transport(ADR/RID) Sea transport (IMDG) Air transport (ICAO/IATA)

UN-Number: Not regulated Not regulated Not regulated

UN Proper shipping name: Not regulated Not regulated Not regulated

Transport hazard Class: Not regulated Not regulated Not regulated

Packaging group: Not regulated Not regulated Not regulated

Environmental hazards: No No No

Special precautions for user: See section 2.2 See section 2.2 See section 2.2

Transport in bulk according to

Annex II of MARPOL 73/78 and

the IBC Code

Not regulated Not regulated Not regulated

Section 15 Regulation information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant information regarding authorization: Not applicable.

Relevant information regarding restriction: Not applicable.

Other EU regulations: Employment restrictions concerning young person must be observed. For use

only by technically qualified individuals.

Other National regulations: Not applicable

Chemical Safety Assessment has been carried out? YES X NO

Section 16 Other information

16.1 Indication of changes

Version 1.1 Amended by EU No 453/2010

Version 2.0 Placed exposure scenarios in the Annex (eSDS)

16.2 Relevant R- phrases (number and full text):

No

16.3 Training instructions:

Not applicable.

16.4 Further information:

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

16.5 Notice to reader:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

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This substance is not classified as hazardous according to REGULATION (EC) No 1272/2008. Therefore, exposure scenario is not required in accordance with EU REACH