0. Revision history

Rev. No.	Rev. Date (YY.MM.DD)	Revision reason & contents	remark
0	2013.11.25	GHS SDS	
1	2017.06.13	Add Use and OSHA PEL	
2	2018.12.20	GHS Classification and toxicity data update	

Related document	

1. IDENTIFICATION

A. **Product name** : Acetonitrile

B. **Recommeded use and restriction on use** : Used for solvent extraction, solvent reaction, reagent analysis, etc.

C. **Manufacturer/Supplier/Distributor information**

o Manufacturer information : 108-70, Sapyeong-ro, Nam-gu, Ulsan, 44785 Korea

o Emergency telephone number : ☎ 052-259-7691, 260-0178

o Division/Person in charge : Safety team

2. HAZARD IDENTIFICATION

A. GHS Classification

Physical hazards	
o Flammable Liquids : Category 2	
Health hazards	
o Acute toxicity(oral) : Category 4	o Acute toxicity(inhalation) : Category 4
o Acute toxicity(dermal) : Category 4	o Eye damage/irritation : Category 2
Environmental hazards	
o Hazardous to the aquatic environment(Acute hazard) : Not classified	o Hazardous to the aquatic environment(Long-term hazard) : Not classified

B. GHS label elements

1) Hazard symbols

2) Signal words : Danger

3) Hazard statements

H225 Highly flammable liquid and vapour

H302 Harmful if swallowed

H312 Harmful in contact with skin

H332 Harmful if inhaled

H319 Causes serious eye irritation

4) Precautionary statements

(1) Prevention

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

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ventilating/lighting/equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

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

P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/eye protection/face protection.

(2) Response

P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor/physician if you feel unwell.
P330	Rinse mouth.
P337+P313	If eye irritation persists: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
P370+P378	In case of fire: Use powder, foam(alcoholic foam), water spray, carbonate gas for extinction.

(3) Storage

P403+P235	Store in well-ventilated place. Keep cool.

(4) Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations (to be specified).

C. Other hazards which do not result in classification

o Flammable liquid. Vapor/air mixtures are explosive above flash point. Combustion emits toxic gases .
o NFPA : Health 2, Flammability 3, Reactivity 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

A. Chemical name : Acetonitrile
B. Synonym : Methyl Cyanide
C. CAS No. or Identification No. : 75-05-8, KE-00067
D. Content(%) : 99.9%

4. FIRST AID MEASURES

A. Eye contact :

o Immediately flush eyes with plenty of water for at least 15minutes and call a doctor/physician.
o Wash throughly corner of the eyelid with your fingers to open the eyes.
o Remove contact lenses, if present and easy to do. Continue rinsing.

B. Skin contact :
o Remove/Take off immediately all contaminated clothing and shoes.
o Wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.

C. Inhalation contact :
o Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTRE or doctor/physician.
o If breathing is stopped, give artificial respiration.
o If breathing is irregular, supply oxygen.

D. Ingestion contact :
o Immediately induce vomiting, rinse your mouth with water. Get medical attention immediately.

E. Acute and delayed the most important symptoms/effects :
o Shortness of breath, hyperventilation, panting, seizures, cornea filth etc. and as a pathological effect degenerative changes in the testes and adrenal glands, bleeding and congestion of the lungs appears .

F. Notes to physician :
o Avoid contact with the emergency personnel, respirator and rubber gloves should be worn .
o Artificial respiration apparatus should be used(Do not conduct oral breathing).
o When you receive a doctor's examination, including presenting the SDS information on this product will be available to physicians.
o If the absorption acetonitrile, Immediately will carry out detoxification by a doctor .

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media :
o Suitable extinguishing media : Dry chemical, foam(alcoholic foam), spray, carbonate gas
o Unsuitable extinguishing media : Water jet

B. Specific hazards arising from the chemical :
o Extremely flammable, ignite easily by Heat, sparks, flames.
o Containers may explode if exposed.
o The irritating, toxic or corrosive gas may occur by fire.
o Occurs highly flammable liquid and vapor.

C. Special protective actions for firefighters :
o Use powder foam, carbon dioxide, dry sand in initial fire.
o In the case of large fire, use foam to block the air is effective.
o Conduct fire suppression from the direction of the wind, certainly wear protective equipment(Refer 8 .EXPOSURE CONTROLS/PERSONAL PROTECTION).

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures :
o Keep unauthorized personnel out.
o Stay upwind and keep out of low areas.
o Firefighters self-contained respirator and protective clothing should be worn.

o Remove all of the ignition source.

B. Environmental precautions :

o Waterways, sewers or confined spaces to prevent the influx.

o Notification to 911, central government, local government. When emissions at least of the standard amount.

C. Methods and materials for containment and cleaning up :

o Small leak : dry earth and sand or other non-combustible material, please let use absorption. Collected them in sealed containers.

o Large leak : Quickly to prevent leakage with earth and sand, mop, and will be recovered in a safe place.

o After collecting spill, wash enough in contaminated area.

7. HANDLING AND STORAGE

A. Precautions for safe handling :

o Wear personal protective equipment.(Refer 8.EXPOSURE CONTROLS/PERSONAL PROTECTION).

o Avoid contact with other sources of ignition such as flames, static electricity, sparks in handling areas and around.

o Avoid physical shock, conduction and friction.

o Measures against static electricity and conductive clothes and safety shoes will be worn.

o Wash after handling.

o Remove contaminated clothing and laundry before reuse.

o Store in airtight containers and handling in places well-ventilated or local exhaust ventilation system is installed.

o Treat to avoid occurrence of vapor and mist.

o Keep away incompatible material such as oxidizing material.

o Use explosion-proof equipment and facilities will be carried out measures for static electricity.

B. Conditions for safe storage, including any incompatibilities :

o Save in cool, dry and well ventilated place.

o Avoid contact with other sources of ignition such as heat, sparks, flames.

o Keep away strong acid and alkali, oxidizing material.

o If store in tank, spray water to avoid the temperature rise in summer.

o Containers : Store in metal(such as steel, stainless) airtight containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits :

o ISHL(The industrial Safety and Health Law in Korea) :
Acetonitrile : TWA 20 ppm, 33 mg/m3

o OSHA PEL :
Acetonitile : 40 ppm (70 mg/m3)

o ACGIH :
Acetonitrile : TWA 20 ppm

o Biological limit values : Not available

B. Engineering controls

o 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 :

o Respiratory protection

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

o Eye protection

- Wear primary eye protection such as splash resistant safety goggles. Provide an emergency eye wash station and quick drench shower in the immediate work area.

o Hand protection

- Wear suitable chemical resistant gloves(rubber gloves).

o Skin protection

- Wear appropriate chemical resistant clothing(Impervious cloth, rubber shoes).
- Wash thoroughly hands after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Colorless transparent liquid
- Odor : Aromatic(ether) odor
- Odor threshold : Low: 170 ppm
- pH : 6.0~7.5 (5% aqueous solution)
- Solubility(in Water) : Soluble in water. Soluble in alcohol, acetone, ether chloroform.
- Initial Boiling Point/Boiling Ranges : 81.6℃
- Melting point/Melting Ranges : -45℃
- Flash point : 12.8℃(closed cup) 5~6℃(open cup)
- Upper/Lower Flammability or explosive limits : Lower 3vol%, Upper 16vol%
- Viscosity : 0.35 mPa·s (20℃)
- Vapour pressure : 98.64 hPa(20℃)
- Specific gravity(water=1) : 0.79(20℃)
- Vapour density : 1.42 (air=1)
- Autoignition temperature : 524℃
- Partition coefficient of n-octanol/water : log Pow = -0.34
- Molecular weight : 41.05

10. STABILITY AND REACTIVITY

A. Chemical stability :

o At blocking air and light stable.

B. Possibility of hazardous reactions :

o Causes heat and combustion on contact with oxidants.

C. Conditions to avoid :

o Direct sunlight, Heating.

D. Incompatible materials :

o Toxic gases occurs on contact with oxidizing material, strong acid and strong base. nitrating agents, nitrogen-fluorine compounds oxidizers, perchlorates, sulphites.

E. Hazardous decomposition products :

o Carbon monoxide, Carbon dioxide, Ammonia, Nitrate gas, Nitrogen oxides(NO, NO2

etc.), Hydrogen cyanide(HCN)

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure
- o (Respiratory tracts) : Not available
- o (Oral) : Harmful if swallowed
- o (Eye, Skin) : Causes serious eye irritation

B. Delayed and immediate effects and also chronic effects from short and long term exposure
- o Acute toxicity :
  - Oral : Rat LD50 1.68~8.53 mL/kg, Mouse LD50 617 mg/kg
  - Dermal : Rabbit LD50 >2,000 mg/kg
  - Inhalation(vapour) : Rat LC50 16,000 ppm/4hr (conversion: 26.8 mg/L/4hr), Mouse LC50 3,587 ppm/4hr (conversion: 6.022 mg/L/4hr)
- o Skin corrosion/irritation :
  - Non-irritating in rabbits. Not corrosive.
- o Serious eye damage/irritation :
  - Irritating eyes[1)]
  - Severely Irritating in rabbits.
- o Respiratory sensitization : Not available
- o Skin sensitization : Negative in guinea pigs (Buehler Test).
- o Carcinogenicity :
  - ACGIH(2002) - A4(Not classifiable as to its catcinogenicity to humans)
  - EPA(1999) - D
  - In a NTP inhalation study with rats and mice an increase in liver adenomas and carcinomas was observed at 400 ppm (the highest dose) in male rats but was not statistically significant compared to controls. No exposure related liver lesions were observed in female rats. There were no exposure related increases in the incidence of lung or liver neoplasms in mice. In summary, the results of the NTP bioassay on acetonitrile do not indicate that acetonitrile was carcinogenic in laboratory rats or mice. Acetonitrile is not classified as carcinogenic by IARC, NTP or the EU CLP.
- o Germ cell mutagenicity :
  - Acetonitrile does not induce gene mutations in bacteria, gave negative responses in all mammalian cell gene mutation assays and has produced only marginal effects in chromosome aberration assays in vitro - equivocal results in presence of metabolic activation but negative in absence of activation. Reliable in vivo micronucleus studies have shown marginal or negative results. The potential of acetonitrile to interfere with chromosome segregation in D. melanogaster has been demonstrated both in vitro and in vivo systems. Not classified as a germ cell mutagen.
- o Reproductive toxicity :
  - No reproductive or developmental effects were seen below maternally lethal doses in the following reliable animal studies: reproductive/developmental toxicity screening (rat, inhalation); organ histopathology and sperm motility (chronic rat and mouse, inhalation); developmental (rat, inhalation and gavage; rabbit, gavage); 2 -generation reproduction (rat, inhalation) or structural analogue acrylonitrile. No classified as toxic to reproduction.
- o Specific target organ toxicity(Single exposure) :
  - Animal studies do not demonstrate target organ effects. Not classified for specific target organ toxicity.

o Specific target organ toxicity(Repeated exposure) :
- NOAECs in reliable chronic rodent inhalation studies are based on mortality (NOAEC in 104 week inhalation study was 400 ppm for rats and 200 ppm for mice).
These studies did not demonstrate target organ effects, clinically or by histopathology, with the exception of forestomach lesions in the mice. Mice exhibited forestomach lesions at all exposure levels; however the role that inhalation exposure plays in the occurrence of these lesions is not known and may be minor compared to ingestion as a result of grooming of contaminated fur and/or mucociliary clearance. Not classified for specific target organ toxicity.

o Aspiration hazard : Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity :

o Fish : 96-hour LC50 1640 mg/L Pimephales promelas (Fathead minnow).
48-hour TLm 730 mg/L Oryzias latipes (Medaka, high-eyes)
48-hour LC50 >1000 mg/L Oryzias latipes (Medaka, high-eyes)
21 -day NOEC >102 mg/L Oryzias latipes

o Crustaceans : LC50 521 mg/L Artemia salina larvae
21-day NOEC (reproduction) 160 mg/L - > 960 mg/L Daphnia magna.

o Algae : 48-hr EC50 in the green algae Raphidocelis subcapitata 7943 mg/L.
72 hr ErC50(growth rate) 9696 mg/L marine algae (Phaeodactylum tricornutum)

B. Persistence and degradability :

o Degradability : Judged to be good by microbial degradation(CSCL regulation in Japan).

C. Bioaccumulative potential :

o Biodegration :
- Biodegration (determined by BOD) 34.5%(NO3), 73.6%(NH4)
(Duration: 3 weeks, Concentration of activated sludge: 30mg/l) [4)]
- Reactivity with OH radical (in air) : $2.1*10^{-14}$cm3/(moleculeIVsec.)(25℃ Exp.) [6)]

o Bioaccumulative potential : BCF(Bioconcentration Factor) 3.2 [5)]

D. Mobility in soil : Not available

E. Other adverse effects : Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods :

o Incinerating : Firebox of an incinerator equipped with afterburner and will be sprayed on the burning. The most common way, or liquidation of the incinerator in low temperatures may cause hydrocyanic acid gas to burn at least 900 ℃ is desirable.

o Activated sludge system : Dilute aqueous solution of acetonitrile valid.
- Disposal containers to check the balance, the balance would be handled by the above method.
- Before disposal, washing the inner wall of the container with water. The cleaning of the drainage as the activated sludge wastewater treatment process in the system and not directly discharged into rivers that end.
- Wear protective equipment when working.

B. Special precautions for disposal :

o 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.

14. TRANSPORT INFORMATION

A. UN number : UN1648
B. Proper shipping name : Acetonitrile
C. Hazard class : Class 3
D. Packing group : Packing Group II
E. Marine pollutant : Not applicable
F. Special precautions for user related to transport or transportation measures:
o EmS FIRE SCHEDULE : F-E
o EmS SPILLAGE SCHEDULE : S-D

15. REGULATORY INFORMATION

A. KOREA regulation :
o Korea Existing Chemicals List(KECL) : Listed
o Korea Occupational Exposure Standards : Regulated
o Korea Toxic Chemicals Control Act : Not regulated
o Korea Toxic Release Inventory(TRI) Chemicals : Not regulated
o Dangerous goods Safety Management Law : Regulated

B. Other local or international regulation
o U.S. Regulation
- CERCLA 103(40CFR302.4) : 5000 LBS RQ
- EPCRA Section 302(40CFR355.30) : Not applicable
- EPCRA Section 304(40CFR355.40) : Not applicable
- EPCRA Section 313(40CFR372.65) : Not applicable

o EU Classification
- Hazard Classification : H225, H302, H312, H319, H332

o TSCA(Toxic Substances Control Act) : Listed

16. OTHER INFORMATION

A. References
1) HSDB(Hazardous Substaces Data Bank: U.S. National Library of Medicine)
2) IUCLID: International Uniform Chemical Information Database
3) IPCS(Environmental health criteria 154)
4) Chemical inspection association, Safety assessment sheet CSCL regulation in Japan(96-17)
5) Risk assessment of chemicals (Ministry of the Environment)(Vol. 1~4)
6) HOARD, P.H.and MERYLAN,W.M.,ed(1997) Handbook of Physical properties of Organic Chemical, Boca Raton, New York, London, Tokyo, CRC Lewis publisher, P53.

B. Issue date : 2013. 11. 25.
C. Revision number and Last date revised : Refer revision history on the first page.
D. General Information
o This SDS is prepared based on improved data/information now available. Also, this SDS is informed storage and handling method in general condition, therefore must use to make appropriate safety measure in specific storage and handling condition.
o TONGSUH PETROCHEMICAL CORP., LTD. is handling with attention in accordance with

SDS and cannot guarantee that these are the only hazards, which exist.

o This SDS intend to inform about stability of product based on a use of product and known ingredients. Accordingly, must use to confirm about the law and regulation or suitability, stability in accordance with research and tests.

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