



# Acrylonitrile

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CAS No.	KE No.	UN No.	EU No.
107-13-1	KE-29393	1093	203-466-5

## I. Chemical Product and Company Identification

1. Product Name : Acrylonitrile, Inhibited
2. Chemical Formula :  $\text{CH}_2\text{CHCN}$
3. Manufacturer/Supplier Information  
Taekwang Industrial Co., Ltd.  
310, DongHo-ro, JungGu, Seoul, Korea.  
C.P.O BOX : 1173 Seoul[  
Cable " TAE KWANG " SEOUL  
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Fax. 82-2-3406-0226  
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4. Emergency Contact Point
  - Department : Taekwang Industrial Co., Ltd. Petrochemical 3rd Plant  
Safety & Environment ( S & E ) Team or  
Taekwang Industrial Co., Ltd.  
Petrochemical Sales Department
  - Tel. No. : S & E Team 82-52-259-9691 or  
Sales Department 82-2-3406-0334

## II. Hazards Identification

1. Health Hazard Classification
  - Flammable liquid Category 2
  - Acute Toxicity Substance(Oral) Category 3
  - Acute Toxicity Substance(Dermal) Category 2
  - Acute Toxicity Substance(Inhalation : Vapor) Category 2
  - Skin Corrosion/Irritation Substance Category 2
  - Eye Damage/Irritation Substance Category 1
  - Skin Sensitization Substance Category 1
  - Carcinogenicity Substance Category 1B
  - Germ Cell Mutagenicity Substance Category 2
  - Reproductively Toxicity Substance Category 2
  - Specific Target Organ Systemic Toxicity Substance(Single Exposure)  
: Category 1 Nervous System, Kidney
  - Specific Target Organ Systemic Toxicity Substance(Single Exposure)  
: Category 3 Respiratory Tract Irritation,
  - Specific Target Organ Systemic Toxicity Substance(Single Exposure)

- : Category 3 Narcotic effects
- Specific Target Organ Systemic Toxicity Substance(Repeated Exposure)
- : Category 1 Nerves System, Air Way, Blood System, Testis, Kidney, Liver
- Aquatic Environment Harmful Substance Category 2

## 2. Warning

- Danger/Hazard Symbol



- A Signal Word

Danger !

- Warning Statement

H225 Highly flammable liquid and vapour

H301 Toxic if swallowed

H310 Fatal in contact with skin

H315 Causes skin irritation

H317 May cause an allergic skin reaction

H318 Causes serious eye irritation

H330 Fatal if inhaled

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H350 May cause cancer

H370 Causes damage to organs

H372 Causes damage to organs through prolonged or repeated exposure

H411 Causes damages to aquatic organs due to long term effects

- Precautionary statements

- Precaution

P201 Obtain special instructions before use

P202 Do not handle until all safety precautions have been read and understood

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.  
(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 Do not breathe dust/fumes/gas/mist/vapours/spray.

P262 Do not get in eyes, on skin, or on clothing

P264 Wash handling area thoroughly after handling.

P270 Do not eat, drink or smoke when using this product

P271 Use only outdoors or in a well-ventilated area  
P272 Contaminated work clothing should not be allowed out of the workplace.  
P273 Do not discharge into the environment  
P280 Wear protective gloves/protective clothing/eye protection/face protection  
P284 Wear respiratory protection in case of inadequate ventilation

- Response

P301+ P310 Immediately call a POISON CENTER/doctor/ if swallowed  
P302+ P352 Wash with plenty of water if on skin  
P303+ P361+ P353 Take off immediately all contaminated clothing if on skin or hair and  
Rinse skin with water/shower  
P304+ P340 Remove person to fresh air and keep comfortable for breathing if inhaled  
P305+ P351+ P338 Rinse cautiously with water for several minutes if in eyes and remove  
contact lenses if present and easy to do. Continue rinsing  
P308+ P311 Call a poison center/doctor if exposed.  
P308+ P313 Get medical advice/attention if exposed or concerned.  
P310 Immediately call a POISON CENTER/doctor  
P312 Call a Poison center/doctor/ if you feel unwell  
P320 Urgently do first aid  
P321 Do first aid  
P330 Rinse mouth  
P332+ P313 Get medical advice/attention if skin irritation occurs  
P333+ P313 Get medical advice/attention if skin irritation or a rash occurs  
P337+ P313 Get medical advice/attention if eye irritation persists  
P361 Take off immediately all contaminated clothing  
P362+ P364 Take off contaminated clothing, wash contaminated clothing before reuse  
P363 Wash contaminated clothing before reuse  
P370+ P378 Use fire extinguisher, water spray, foam in case of fire  
P391 Collect leak

- Storage

P403+ P233 Store in a well ventilated place. Keep container tightly closed  
P403+ P235 Store in a well ventilated place. Keep cool  
P405 Store locked up.

- Disposal

P501 Dispose of content/container in accordance with national designated waste  
regulation.

3. Other hazards which do not result in Classification

○ NEPA Rating(Scale 0-4)

- Health : 4 (Very short exposure could cause death or serious residual injury even though prompt medical attention was given)
- Fire : 3 (Liquids and solids that can be ignited under almost all ambient conditions.)
- Instability : 2 (Normally unstable and readily undergo violent decomposition but do not

detonate. Also may react violently with water or may form potentially explosive mixtures with water.)

### III. Composition and information on ingredient

Main Chemical

1. Chemical Name : Acrylonitrile
2. Synonym : Vinyl Cyanide, Propenitrile
3. CAS. No. : 107-13-1
4. Composition : More than 99.5%

Acrylonitrile Contains Traces of Acrylonitrile Inhibitor such as Water and 4-Methoxyphenol r as followings.

(1) Water

- 1) Chemical Name : Water
- 2) CAS. No. : 7732-18-5
- 3) Composition : Less than 0.5 wt %

(2) 4-Methoxyphenol

- 1) Chemical Name : 4-Methoxyphenol(MEHQ)
- 2) CAS. No. : 150-76-5
- 3) Composition : 35 ~ 45 ppm(wt)

### IV. First Aid Measures

1. Eye Contact for Acrylonitrile

Immediately flush with lots of water for at least 15 minutes.  
Then get immediate medical attention.

2. Skin Contact for Acrylonitrile

Wash skin with lots of water for at least 15 minutes  
while removing contaminated clothing and shoes.  
If needed, Get medical attention.  
Completely clean and dry contaminated clothing before reuse.

3. Inhalation for Acrylonitrile

Take the inhaled person to safe area and remove from exposure to fresh air.  
Use a bag valve mask or similar device to perform artificial respiration if not breathing.  
Immediately get medical attention

4. Ingestion for Acrylonitrile

Contact local poison control center or physician immediately.  
When vomiting occurs spontaneously, keep head lower than hips to prevent acrylonitrile  
form inhaling the lungs.  
If person is unconscious, never make him vomit or drink anything.  
If person is unconscious, turn head to side.

Get medical attention immediately.

#### 5. Delayed and immediate effects

##### ○ Inhalation

###### - Short Term Exposure

: irritation, itching, nausea, vomiting, diarrhea, stomach pain, irregular heartbeat, headache, drowsiness, dizziness, bluish skin color, suffocation, convulsions, coma, dyspnea, blood disorders

###### - Long Term Exposure : digestive disorder, reproductive effects, cancer

##### ○ Skin Contact Exposure

###### - Short Term Exposure

: irritation (possibly severe), allergic reactions, blisters, suffocation, same as effects reported in Short Term Exposure, possibly absorbable.

###### - Long Term Exposure : same as effects reported in Short Term Exposure

##### ○ Eye Contact

###### - Short Term Exposure : Burns

###### - Long Term Exposure : same as effects reported in Short Term Exposure

##### ○ Ingestion

###### - Short Term Exposure : suffocation, same as effects reported in Short Term Inhalation

###### - Long Term Exposure : reproductive effects, cancer

#### 6. First Aid and Note to Physician

For inhalation, break an amyl nitrite ampule( 0.2ml ) in a cloth and hold ampule lightly under nose for 30 seconds. Repeat inhalation of amyl nitrite at about 30 second intervals. Resume oxygen between amyl nitrite. Use a new amyl nitrite ampule every 5 minutes until directed otherwise by medical personnel.

If patient exhibits signs suggestive of cyanide poisoning following exposure, and has not responded to amyl nitrite, inject intravenously 10 milliliters of a 3% solution of sodium nitrite at a rate not greater than 2.5 to 5.0 milliliters per minute.

Consider oxygen.

Antidote : Nithiodote(intravenous)

- contents : sodium nitrite, sodium thiosulfate

## V. Fire Fighting Measures

#### 1. Extinguishing Media

○ Adequate extinguishing media : regular dry chemical, carbon dioxide, water, regular foam alcohol resistant foam

○ Inadequate extinguishing media : None

○ Large Fire : Use regular foam or flood with fine water spray.

#### 2. Specific Hazards Arising from the chemical

○ pyrolysis product

cyanide compounds

nitrogen oxide

○ Fire and Explosion Hazards.

Severe fire hazard.

Vapor/Air Mixtures are explosive.

Vapor may cause evaporating combustion

May be polymerize.

Containers may rupture or explode.

May explode when the closed container in acrylonitrile is heated.

3. Fire Fighting

Do not get water inside container

Cool containers with water spray until well after the fire is out.

Stay away from the ends of tanks.

For fires in cargo or storage area:

Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out.

If this is impossible, then take the following precautions:

Keep unnecessary people away, isolate hazard area and deny entry.

Let the fire burn.

Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.

For tank, rail car or tank truck, evacuation radius : 800 meters (1/2 mile).

Water may be ineffective.

## VI. Accidental Release Measures

1. Personal Precautions and Protective equipment

Avoid heat, flames, sparks and other sources of ignition.

Do not touch spilled material.

Stop leak if possible without personal risk.

Reduce vapors with water spray.

2. Environmental precautions

○ Air : N/A

○ Soil : N/A

○ water : Keep out of water supplies and sewers.

3. Methods for containment and cleaning up

○ Small spills: Flood with water.

○ Large spills: Dike for later disposal.

Remove sources of ignition.

Keep unnecessary people away, isolate hazard area and deny entry.

Notify local government, local environmental office, police station, fire station, or local labor authority.

Minster of Environment distributes the report to other organizations.

## VII. Handling & Storage Information

1. Safe Handling Information : N/A

## 2. Safe Storage Information

Protect from physical damage.

Store outside or in a detached building.

Store with flammable liquids.

Keep separated from incompatible substances.

Monitor inhibitor content.

Secure to prevent tipping.

Use diking sufficient to contain total contents plus 10%.

## VIII. Exposure Control & Personal Protection

### 1. Exposure Limit

○ Korea Regulation : TWA-2ppm, 4.5mg/m<sup>3</sup>

○ ACGIH Regulation : TLV-TWA - 2ppm

○ Biological Exposure limit : N/A

### 2. Adequate Exposure Control

Provide local exhaust or process enclosure ventilation system.

Ensure compliance with applicable exposure limit.

### 3. Personnel Protective Equipment

○ Respirator :

Respirator must be complete examination of KOSHA("안" mark)

- The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

1) If exposure amount is maximum 20 ppm, wear the following respirator.

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

Any supplied-air respirator with a full facepiece.

2) If exposure amount is maximum 100 ppm, wear the following respirator.

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

Any supplied-air respirator with a full facepiece.

Any self-contained breathing apparatus with a full facepiece.

3) If exposure amount is maximum 4000 ppm, wear the following respirator.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

- For Unknown Concentrations 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 that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

- Escape

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

Any self-contained breathing apparatus.

○ Eye Protection :

Wear splash resistant safety goggles with a facepiece.

Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

○ Gloves:

Wear appropriate chemical resistant gloves.

○ Clothing :

Wear appropriate chemical resistant clothing.

## IX. Physical and Chemical Properties

1. Physical State : colorless liquid
2. Oder : pungent odor
3. Odor Threshold : 21.4 ppm
4. pH: 6.0-7.5
5. Freezing Point : -84 ~ -83°C
6. Boiling Point : 77 ~ 79°C (at 760mmHg)
7. flash point : -1.1°C
8. Evaporation Rate : 4.5(butyl acetate=1)
9. Flammability(solid, gas) : not available
10. upper/lower limit in Flammable or Explosion Range : 17%~3%
11. Vapor Pressure : 109mmHg (at 25°C)
12. Solubility : 7.45g/100ml(water)
13. Vapor Density : 1.83(air=1)
14. Specific Gravity : 0.8060(Water=1)
15. n-Octanol/Water distribution coefficient : 0.25
15. Spontaneous Combustion Temperature : 481°C
16. Dissolution Temperature : not available
17. Viscosity : 0.34cP (at 25°C)
18. Molecular weight : 53.06
19. SAPT (self-accelerating polymerization temperature) : 200°C

## X. Stability and Reactivity

1. Chemical Stability
  - May polymerize violently or explosively.
  - May explode if heated in closed container.
2. Possibility of hazardous reactions
  - May polymerize violently or explosively.
  - Avoid contact with curing agents, accelerators, and/or initiators.
3. Conditions to Avoid
  - Avoid heat, flames, sparks and other sources of ignition.
  - Avoid contact with Plastics or rubber.
  - Containers may rupture or explode if exposed to heat
  - Minimize contact with material.
  - Keep out of water supplies and sewers.
4. Substance to avoid
  - Incompatibilities : acids, metals, amines, bases, halogens, peroxides, combustible materials, oxidizing materials
5. Hazardous decomposition

- Thermal decomposition products : cyanide compounds , nitrogen oxide

## **XI. Toxicological Information**

### 1. Information on the likely route of exposure.

- Inhalation : irritation, itching, nausea, vomiting, diarrhea, stomach pain, irregular heartbeat, headache, drowsiness, dizziness, bluish skin color, suffocation, convulsions, coma, dyspnea, blood disorders
- Swallow : suffocation, same as effects reported in inhalation
- Skin Contact : irritation (possibly severe), allergic reactions, blisters, suffocation, same as effects reported in inhalation , possibly absorbable
- Eye Contact : burns

### 2. Delayed and immediate effects and also chronic effects from short and long term exposure :

- Acute Toxicity :
  - Oral : LD50 = 72~186 mg/kg Rat EU RAR  
LD50 = 81 mg/kg Mouse ECB IUCLID
  - Skin : LD50 = 148~282 mg/kg Rat EU RAR  
LD50 = 250 mg/kg Rabbit ECB IUCLID
  - Inhalation : LC50 470 mg/m<sup>3</sup>/4h Rat EU RAR  
LC50 425 ppm Rat ECB IUCLID
- Skin Corrosion/irritation : Category 2  
Since erythema, edema was observed in the rabbit skin irritation test(EU-RAR No.32,3004), Draize Score 3.6
- Serious eye damage/irritation : Category 2A  
Since some data of toxic test (EU-RAR No.32,3004) suggested that it causes serious eye irritation,
- Respiratory Sensitization : N/A
- Skin Sensitization : Category 1  
Since positive reaction was observed in guinea pig maximization test (CICAD 39 (2002))
- Carcinogenicity : Category 1B  
Korea Ministry of Labor (2002) A2, NTP (2005) R, IARC (2005) Group 2B, ACGIH (2006) A3, EU REACH law (2006) grade 2
- Germ Cell Mutagenicity : Category 2  
According to CERi-NITE Hazard Assessment No.64(2003), CICADS 39(2002), EU-RAR No.32(2004), negative in heritable mutagenicity testing, no data in germ cell in vivo mutagenicity testing, positive in somatic cell in vivo mutagenicity testing, negative in germ cell in vivo genotoxicity testing
- Reproductive toxic : Category 2  
Based on the evidence of organ and skeletal malformations in offspring at dosing levels toxic to dams in rat teratogenicity tests, described in CERi-NITE Hazard Assessment No. 64 (2003).
- Specific Target Organ Systemic Toxicity (Single Exposure) : Category 1(nerves system, liver), Category 3(respiratory tract irritation, narcotic effects).  
slight jaundice, spasm in human (CERi-NITE Hazard Assessment No.64 (2003)),effects in central nerve system, liver (CICAD 39 (2002)), eyes, nose, neck irritation, convulsions,

coma, apnoea (NICNAS (2000)) etc.

- Specific Target Organ Systemic Toxicity (Repeated Exposure) : Class 1(nerves system, respiratory, blood system, spermary, kidney, liver)  
, headache, nerves breakdown etc. nerves system symptoms  
(CERI hazard data 96-3 (1997)), eye pain of nose, neck, airway (CERI-NITE hazard assessment No.64 (2003)), hemoglobin concentration·erythrocyte count·leukocyte count fall, immunodepression (EU-RAR No.32 (2004))
  - aspiration hazard : N/A
3. Numerical measures of Toxicity (such as acute toxicity estimates) : N/A

## XII. Ecological Information

1. Aquatic Terrestrial Ecological Toxicity
  - Fish : LC50 9.3 mg/l 96 hr ECOTOX
  - Crustacean : Crustacean (Mysid Shrimp) 96hr LC50 = 5.81 mg/L (CERI-NITE Hazard Assessment) (2005)
  - Algae : EC50 14.1 72hr (ppm) ECHA
2. Persistence and Degradability
  - Persistence : 96% Degradability by BOD (Existed MSDS), log Kow = 0.25 (PHYSPROP Database (2005))
  - Degradability : N/A
3. Bioaccumulative Potential
  - Biodegradability : 96 (%)
  - Accumulation : BCF 48
4. Mobility in soil : N/A
5. Other adverse effects : N/A

## XIII Disposal Considerations

1. Disposal Methods
  - Dispose in accordance with all applicable regulations
  - U.S. disposal regulations : U.S. EPA 40 CFR 262.
  - Hazardous Waste Number(s) : U 009.
2. Disposal Considerations  
N/A

## XIV. TRANSPORT INFORMATION

1. UN Number : 1093
2. UN Proper Shipping Name : Acrylonitrile, Inhibited
3. Transport Hazard Class : 3
4. Packing Group, if applicable : 1
5. Marine Pollutant : applicable
6. Special Precautions , which a user needs to be aware of, or needs to comply with in connection with transport :
  - In case of fire, emergency procedures class : F-E
  - In case of spills, emergency procedures class : S-D

## XV. Regulatory Information

1. Regulation for Korea Industrial Safety and Health Act  
: Work Environment Measurement Required Substance, Regulated Substance,

Specially Controlled Substance

2. Regulation of Korea Chemicals Control Act

: Accident Precaution Chemical, Toxic Chemicals

3. Regulation for Korea Fire Services Act

: Category VI Petrochemical Class 1(Water-Insoluble liquids),200 liter

4. Korea Wastes Control Act : N/A

5. High-Pressure Gas Safety Control Act

: Toxic Gas / Combustible Gas

6. Other Country Regulation

○ Other Domestic Regulation

- Persistent Organic Pollutants Administration Law : N/A

- Hazardous and Noxious Substances (HNS) : Applicable

- Act on Control etc. of Manufacture of Specific Substances for Protection of the Ozone Layer : N/A

○ EU classification information

- Firm classification results :

F; R11

Carc. Cat. 2; R45

T; R23/24/25

Xi; R37/38-41

R43

N; R51-53

- Hazard statement : R45, R11, R23/24/25, R37/38, R41, R43, R51/53

- Precautionary measures statement : S9, S16, S53, S45, S61

- EU REACH : Cancer substance

○ U.S. Regulations

- OSHA Regulation (29CFR1910.119) : N/A

- CERCLA 103 Regulation (40CFR302.4) : 45.3599(kg) 100(lb)

- EPCRA 302 Regulation (40CFR355.30) : 4535.99(kg) 10000(lb)

- EPCRA 304 Regulation (40CFR355.40) : 45.3599(kg) 100(lb)

- EPCRA 313 Regulation (40CFR372.65) : Available

○ Rotterdam Convention substance: N/A

○ Stockholm Convention substance : N/A

○ Montreal Protocol substance : N/A

○ Japan Regulations

- Chemical Substances Control Law : N/A

- Pollutant Release and Transfer Registers : Designated Chemical Substances. Class 1

- Poisonous and Deleterious Substances Control Act : Deleterious Substance

- High Pressure Gas Safety Act : Toxic Gas / Combustible Gas

## XVI References

The References are provided as followings.

(1) ICSC

(2) EHC

- (3) HSDB
- (4) EU-RAR No.32
- (5) CICAD
- (6) Korea Ministry of Labor
- (7) NTP
- (8) IARC
- (9) ACGIH
- (10) EU REACH Law
- (11) NICNAS
- (12) CERI Hazard Data 96-3
- (13) CERI-NITE Hazard Assessment
- (14) SIDS Initial Assessment of Existing Chemicals
- (15) PHYSPROP Database