INEOS Nitriles

Material Safety Data Sheet

1. Chemical product and company identification

Product name ACRYLONITRILE

MSDS # 0000000892

Code 0000000892 (NAP)

Product use Industrial applications

Supplier INEOS USA LLC
2600 South Shore Blvd.
League City, Texas 77573

EMERGENCY SPILL INFORMATION: 1 (800) 424-9300
Outside the US: +1 703-527-3887 (CHEMTREC)

OTHER PRODUCT INFORMATION 1 (866) 363-2454
http://techservice.innovene.com

2. Composition/information on ingredients

Ingredient name	CAS #	% by weight
Acrylonitrile	107-13-1	>99.4
Water	7732-18-5	<0.6

3. Hazards identification

Physical state Liquid. (Colorless.)

Color Colorless.

Emergency overview DANGER! CORROSIVE.

EXTREMELY FLAMMABLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
CAUSES SKIN BURNS.
Toxic if swallowed.
TOXIC IF ABSORBED THROUGH SKIN.
TOXIC IF INHALED.
CAUSES EYE IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
CANCER HAZARD
CONTAINS MATERIAL WHICH CAN CAUSE CANCER
MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: BLOOD, LIVER, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM

Do not ingest. Do not get in eyes, on skin or on clothing. Do not breathe vapor or mist. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.

Routes of entry Dermal contact. Eye contact. Inhalation. Ingestion.

Potential health effects

Eyes Causes severe eye irritation. Liquid will cause conjunctival irritation and corneal damage. Vapour may cause conjunctival irritation.

Skin Toxic if absorbed through skin. Corrosive. Causes skin burns May cause allergic skin reaction. Liquid or vapor may be absorbed in toxicologically significant amounts. Skin absorption may be a significant route for exposure. Absorption will be rapid. Effects will be similar to those resulting from ingestion. Contains material which can cause cancer.

Inhalation Toxic if inhaled. Irritating to respiratory system. May cause headache, weakness, dizziness, shortness of breath, cyanosis, rapid heart beat, unconsciousness, and possible death. Odor does not provide reliable warning of exposure. Contains material which can cause cancer.

Ingestion	Toxic if swallowed. Causes severe irritation or burns of the mouth, throat, and esophagus. May cause headache, weakness, dizziness, shortness of breath, cyanosis, rapid heart beat, unconsciousness, and possible death. Ingestion may irritate the gastrointestinal tract and may cause nausea and vomiting. Contains material which can cause cancer

See toxicological information (section 11)

4. First aid measures

Eye contact	Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. If symptomatic, treat as described under inhalation. Get medical attention immediately.
Skin contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash contaminated clothing before reusing. Do not use protective clothing made of leather, natural or nitrile rubber. If such clothing is contaminated with acrylonitrile, it should be destroyed by burning. Note that contaminated clothing may be a fire hazard. Get medical attention immediately.
Inhalation	If inhaled, remove to fresh air. Get medical attention immediately. Cyanide first aid treatment (containing amyl nitrite capsules) must be available at site. Authorized personnel, acting under standing instructions, may break a capsule of amyl nitrite in a handkerchief and hold it about one inch from the patient's mouth and nostrils for 30 seconds every minute. If not breathing, if irregular breathing, or respiratory arrest occurs provide artificial respiration or oxygen by trained personnel. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately. Do not wait for symptoms to develop.
Notes to physician	Notes to Physician: The onset of symptoms is typically delayed for up to several hours after oral ingestion, inhalation or dermal contact. The prolonged duration of symptoms, regardless of route of exposure, may require repeat doses of cyanide antidotes. Treat as in cyanide poisoning. Toxicity may be delayed due to metabolic release of cyanide. Support respiratory and cardiovascular function. Administer 100% oxygen and monitor blood gases. If symptomatic administer amyl nitrite until intravenous access is established, then inject sodium nitrite (10ml of a 3% solution over 5 minutes) . Monitor blood pressure closely as sodium nitrite is a potent vasodilator. Follow the sodium nitrite directly with intravenous sodium thiosulfate (25% solution), 1.65ml(412mg)/kg of body weight for those under 25kg and 12.5gm (50ml) for those over 25kg. Give at a rate of 2.5-5.0ml/minute. If signs of poisoning persist or reappear, repeat nitrite and thiosulfate injections 30 minutes to an hour later at half the original dose. Monitor blood methemoglobin levels. They should not be allowed to exceed 30-40%. Even when the patient seems perfectly well, the medication may be given for prophylactic purposes 2 hours after the first injections. Whenever the cyanide antidote kit is used the patient should be admitted to an intensive care unit. Monitor arterial gases. Treat lactic acidosis and metabolic acidosis with sodium bicarbonate. Treat seizures with diazepam, phenytoin, or phenobarbital. Hyperbaric oxygen and hemodialysis may be helpful in severe cases not responsive to supportive and antidotal therapy. Hypotension secondary to nitrites should be treated with intravenous fluids and the Trendelenburg position. If pulmonary edema develops, maintain ventilation and oxygenation with close arterial gas monitoring. PEEP or CPAP may be necessary if pO2 remains below 50mm Hg. Avoid net positive fluid balance. Blood cyanide and serum thiosulfate levels will be helpful for documentation although they might not be available for several days. Do not induce emesis in cases of ingestion. Gastric lavage may be performed with a large bore tube after endotrachael intubation. Administer activated charcoal slurry to prevent absorption. Administer one dose of a saline cathartic or sorbitol mixed with charcoal or given separately. Patients should be observed a minimum of 24-48 hours.

5. Fire-fighting measures

Flammability of the product	Flammable.
Auto-ignition temperature	481 °C
Flash point	-1 °C (Closed cup) Pensky-Martens.
Explosion limits	Lower: 3 % Upper: 17 %
Products of combustion	These products are carbon oxides (CO, CO_2) (carbon monoxide, carbon dioxide), nitrogen oxides (NO, NO_2...), Hydrogen Cyanide (HCN). Evolves toxic fumes when heated to the decomposition state. When heated to decomposition it emits acrid smoke and irritating fumes.
Unusual fire/explosion hazards	Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Explosive in presence of open flames, sparks and static discharge
Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back.
Runoff to sewer may create fire or explosion hazard.
May re-ignite itself after fire is extinguished.

Fire-fighting media and instructions

In case of fire, use water fog, foam, dry chemicals, or carbon dioxide. Water may be ineffective. Do not use water jet. DO NOT FIGHT FIRE WHEN IT REACHES MATERIAL. Withdraw from fire and let it burn. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. First move people out of line-of-sight of the scene and away from windows. Cool containing vessels with flooding quantities of water until well after fire is out.

Protective clothing (fire)

Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear. Wear butyl rubber boots and full chemical protective suit if high vapor concentration or significant liquid splash potential exists.

6. Accidental release measures

Personal precautions

Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (See Section: "Exposure controls/personal protection"). Follow all fire fighting procedures (See Section: "Fire-fighting measures"). Do not touch or walk through spilled material.

Environmental precautions and clean-up methods

If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways. See Section 13 for Waste Disposal Information.

Personal protection in case of a large spill

Butyl rubber is the protective material of choice. Protective clothing must be made from materials specifically recommended for protection against acrylonitrile penetration. Consult your local safety specialist for a list of recommended materials. Wear butyl rubber boots and full chemical protective suit if high vapor concentration or significant liquid splash potential exists. Wear full face respirator for eye protection if high vapor concentration or significant liquid splash potential exists. A self-contained breathing apparatus should be used to avoid inhalation of the product.

7. Handling and storage

Handling

Use suitable protective equipment (See Section: "Exposure controls/personal protection"). Do not ingest. Do not get in eyes, on skin or on clothing. Use only with adequate ventilation. Do not breathe vapor or mist. Cyanide first aid treatment (containing amyl nitrite capsules) must be available at site. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.

Storage

Store in a segregated and approved area. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Suitable storage materials are mild steel. stainless steel. Do not store in copper and its alloys. Keep container tightly closed and sealed until ready for use. Inhibit with: p-Methoxyphenol (MEHQ). To maintain inhibitor activity, oxygen must not be eliminated from the atmosphere above the product. If the explosion risk posed by storing under air is unacceptable, use oxygen depleted air (5% oxygen minimum). Check inhibitor level periodically.

8. Exposure controls/personal protection

Occupational exposure limits

Ingredient name	Occupational exposure limits
Acrylonitrile	**ACGIH TLV (United States, 1/2004). Skin** TWA: 4.3 mg/m^3 8 hour(s). TWA: 2 ppm 8 hour(s). **OSHA Final Rule (United States, 1989). Skin** CEIL: 10 ppm 15 minute(s). **OSHA PEL (United States, 8/1997). Skin** CEIL: 10 ppm TWA: 2 ppm 8 hour(s).
Water	None assigned.

Control Measures	Handle only in totally enclosed systems. Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are close to the work-station location.
Hygiene measures	Wash hands after handling compounds and before eating, smoking, using lavatory, and at the end of day.
Personal protection	
Eyes	Chemical splash goggles. Wear full face respirator for eye protection if high vapor concentration or significant liquid splash potential exists. A respirator is not needed under normal and intended conditions of product use.
Skin and body	Do not get on skin or clothing. Butyl rubber is the protective material of choice. Protective clothing must be made from materials specifically recommended for protection against acrylonitrile penetration. Consult your local safety specialist for a list of recommended materials. Wear butyl rubber boots and full chemical protective suit if high vapor concentration or significant liquid splash potential exists. Do not use protective clothing made of leather, natural or nitrile rubber. If such clothing is contaminated with acrylonitrile, it should be destroyed by burning. Note that contaminated clothing may be a fire hazard. Wash thoroughly after handling.
Respiratory	Use only with adequate ventilation. Do not breathe vapor or mist. Wear full face respirator.
Hands	Wear gloves that cannot be penetrated by chemicals or oil. (Butyl rubber gloves.) The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions. Consult your supervisor or S.O.P. for special handling directions

Consult local authorities for acceptable exposure limits.

9. Physical and chemical properties

Physical state	Liquid. (Colorless.)
pH	6 to 7.5 at 5%
Odor	Pungent. (Slight.)
Color	Colorless.
Boiling point / Range	77.3 °C
Melting point / Range	-83.5 °C
Density	806 kg/m^3 (0.806 g/cm^3) at 20°C
Vapor pressure	11.07 kPa at 20°C
Vapor Density (Air = 1)	1.83
Solubility	7.35 at 20°C
Dispersibility properties	See solubility in water.
LogK$_{ow}$	The product is more soluble in water; log(octanol/water) =0.92
Viscosity	Dynamic: 0 Pa·s (0.34 cP) at 25°C

10. Stability and reactivity

Stability and reactivity	Must be inhibited to prevent hazardous polymerization. Stable under recommended storage and handling conditions (See Section: "Handling and storage").
Conditions to avoid	Keep away from heat and direct sunlight. Avoid all possible sources of ignition (spark or flame).
Incompatibility with various substances	Highly reactive with oxidizing agents, reducing agents, acids, alkalis. This product may polymerize with explosive violence. May polymerize on exposure to sunlight., absence of oxygen., peroxides, alkalis, strong acids, Ammonia., Bromine., Copper.
Hazardous decomposition products	These products are: carbon oxides (CO, CO_2) (carbon monoxide, carbon dioxide) nitrogen oxides (NO, NO_2...). When heated to decomposition it emits acrid smoke and irritating fumes. Evolves toxic fumes when heated to the decomposition state.

Hazardous polymerization Yes. Product stabilized but may polymerize readily. Avoid depletion of inhibitor. Inhibit with: p-Methoxyphenol (MEHQ). To maintain inhibitor activity, oxygen must not be eliminated from the atmosphere above the product. If the explosion risk posed by storing under air is unacceptable, use oxygen depleted air (5% oxygen minimum). Check inhibitor level periodically.

11. Toxicological information

Ingredient name	Test	Result	Route	Species
Acrylonitrile	LD50	81 mg/kg	Oral	Rat
	LD50	226 to 250 mg/kg	Dermal	Rabbit
	LC50	557 ppm (4 hour (s))	Inhalation	Rat
	LCLo	>1008 ppm (1 hour(s))	Inhalation	Rat

Chronic toxicity

Carcinogenic effects

CANCER HAZARD
CONTAINS MATERIAL WHICH CAN CAUSE CANCER
Risk of cancer depends on duration and level of exposure.
Classified 2B (Possible for human.) by IARC: [Acrylonitrile]
Classified 2 (Reasonably Anticipated To Be Human Carcinogens.) by NTP: [Acrylonitrile]
Classified + (Proven) by OSHA: [Acrylonitrile]

Mutagenic effects

Acrylonitrile has been shown to be weekly mutagenic in in-vitro systems: these findings have not been reflected in in-vivo studies.

Reproductive effects

Adverse effects on the developing fetus or on reproduction have been reported in experimental animal studies at doses that were toxic to the mother.

Teratogenic effects

Embryotoxic and teratogenic effects have been observed in the offspring of experimental animals exposed to maternally toxic doses of acrylonitrile.

Other information

Substance has been reported to have skin sensitisation potential when tested by the following procedures:- Magnusson and Kligman.
Studies conducted in China have reported higher than expected rates of reproductive effects and abnormal fetal development among acrylonitrile workers. INNOVENE has not made a determination about the reliability of these studies because important questions remain to be answered about the data collection methodology, chemical exposures, social and lifestyle influences and inconsistencies with other information.

While hydrogen cyanide alone is not known to affect hearing, simultaneous exposure to high levels of noise and concentrations of hydrogen cyanide at levels above the occupational exposure limit resulted in significant hearing loss in experimental animals. The significance of this finding to humans is not known.

12. Ecological information

Ecotoxicity 10.1 mg/l [LC50], 96 hour(s) [Fish (Minnows)].
10.95 mg/l [IC50], 72 hour(s) [Algae].

Persistence/degradability This product is not expected to bioaccumulate through food chains in the environment. Readily biodegradable
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Soil/water partition coefficient (K_{OC}) 0.92

13. Disposal considerations

Waste information Dispose of in accordance with all applicable local and national regulations. Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Comply with all local, regional, and national laws pertaining to waste management.

Consult your local or regional authorities.

14. Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1093	Acrylonitrile, stabilised	3 (6.1)	I	-----	**Reportable quantity** 100 lbs. (45.36 kg)
TDG Classification	UN1093	Acrylonitrile, stabilized	3 (6.1)	I	-----	-----
IMDG Classification	UN1093	Acrylonitrile, stabilized	3 (6.1)	I	-----	-----
IATA Classification	UN1093	Acrylonitrile, stabilized	3 (6.1)	I	-----	**Quantity limitation - Passenger Aircraft** Forbidden **Quantity limitation - Cargo Aircraft** 30 L **Remarks** FORBIDDEN ON PASSENGER AIRCRAFT

15. Regulatory information

U.S. Federal regulations

US INVENTORY (TSCA): Listed on inventory.

SARA Title III Section 302 Extremely Hazardous Substances (40 CFR Part 355): Acrylonitrile

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: ACRYLONITRILE : Fire hazard, reactive, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	ACRYLONITRILE		100
Supplier notification	ACRYLONITRILE		100

CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4):: ACRYLONITRILE : 100 lbs. (45.36 kg)

State regulations

Massachusetts RTK:Acrylonitrile
New Jersey:Acrylonitrile
Pennsylvania RTK:Acrylonitrile (special hazard, environmental hazard, generic environmental hazard)

WARNING: This product contains a chemical known to the State of California to cause cancer. ACRYLONITRILE ; Acrylonitrile

Inventories

AUSTRALIAN INVENTORY (AICS): Listed on inventory.

CANADA INVENTORY (DSL): Listed on inventory.

CHINA INVENTORY (IECS): Listed on inventory.

EC INVENTORY (EINECS/ELINCS): Listed on inventory.

JAPAN INVENTORY (ENCS): Listed on inventory.

KOREA INVENTORY (ECL): Listed on inventory.

PHILIPPINE INVENTORY (PICCS): Listed on inventory.

16. Other information

Label requirements

DANGER! CORROSIVE.

EXTREMELY FLAMMABLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
CAUSES SKIN BURNS.
Toxic if swallowed.
TOXIC IF ABSORBED THROUGH SKIN.
TOXIC IF INHALED.
CAUSES EYE IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
CANCER HAZARD
CONTAINS MATERIAL WHICH CAN CAUSE CANCER
MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: BLOOD, LIVER, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM

HMIS® Rating :

Health	**4**	*
Flammability	**3**	
Physical Hazard	**2**	
Personal protection	**X**	

National Fire Protection Association (U.S.A.)

History

Date of issue 06/28/2006.

Date of previous issue 01/18/2006.

Prepared by Product Stewardship

Notice to reader

NOTICE : This Material Safety Data Sheet is based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We are not responsible for any damage or injury resulting from abnormal use, from any failure to follow appropriate practices or from hazards inherent in the nature of the product.