

INEOS Nitriles

acetonitrile

Emergency Response and Environmental Data for Acetonitrile

Initial Spill Response

The immediate response to a release of acetonitrile should be to isolate the area and then to protect those downwind of the spill. Please access the following link to the US DOT *Emergency Response Guidebook Table of Initial Isolation and Protective Action Distances* referring to ID number 1648 for specific instructions:

<http://hazmat.dot.gov/pubs/erg/greenpgs.htm>

General response guidelines can also be found in the US DOT *Emergency Response Guidebook* by accessing the following link to Guide 127:

<http://hazmat.dot.gov/pubs/erg/g127.pdf>

Physicochemical Information

Common Name: Acetonitrile [CH₃CN]

Physical State: Clear, colorless

Odor: Faint pungent type odor smelled by most individuals in the 40-45 ppm range

Specific Gravity/Density: 0.786 (water = 1.0)

Vapor Density: 1.41 (air =1.0)

Vapor Pressure: 73 mm Hg at 20° C

Water Solubility: Completely soluble in water

Evaporation Rate: >1 (water = 1.0)

Flash Point: 42° F. (5.6° C)

Flammability limits: 4.4 - 16%

General Information

Acetonitrile is a flammable solvent and is considered slightly toxic via inhalation and skin absorption. Responders should also avoid direct skin contact. Exposure to high concentrations (>4000 ppm) of vapors or skin contact can result in cyanide type poisoning in humans. It is particularly important to note that symptoms of overexposure may be delayed several hours. Exposed individuals should obtain immediate medical treatment.

In any spill situation, the immediate release area and a downwind isolation zone should be

established. Vapors are heavier than air and are easily ignitable at ambient temperature conditions. Remove all sources of ignition. Avoid low spots and confined areas as they may accumulate vapors. Containers of acetonitrile in or near a fire can BLEVE. Fire combustion products may be highly toxic and include hydrogen cyanide. Dry chemical, alcohol or AFFF foam and carbon dioxide are recommended materials for fire fighting.

Acetonitrile is stable under normal conditions encountered in transport or use. Chemical incompatibilities include strong acids, bases and oxidizing agents.

Butyl rubber is the preferred material to provide protection against skin contact. Supplied air breathing apparatus should be used until monitoring dictates a lower level of protection. Fully encapsulating vapor protecting suits with full skin protection should be used in the immediate release area or when vapor concentrations are unknown.

Effects of Releases to Water

Acetonitrile is lighter than water so it will initially form a light surface sheen if spilled into water. Due to its high solubility, it will very quickly dissolve into the water column.

The material has a moderately high vapor pressure (73 mm Hg. @ 20° C) with a Henry's Law Constant of 2.9 E-5 atm m³/mole and will volatilize from water into the atmosphere creating potential inhalation concerns in the immediate spill area.

Acetonitrile is slightly toxic to aquatic organisms, freshwater and marine fish. Although aquatic toxicity is highly species and habitat dependent, fish kills could be expected in the concentration range of 1500 -2000 ppm. There are no data available on chronic aquatic toxicity. Extended toxicity testing (96 hour) indicates an LC-50 of 1000 ppm.

Acetonitrile is not expected to persist in receiving waters for more than a few weeks. Biodegradation will readily occur in both fresh and salt water. The decomposition of the compound in river water has been observed to occur at 20% in 5 days and 40% in 12 days. Biodegradation products include ammonia and carbon dioxide. Hydrolysis in water is not expected to be a likely fate mechanism.

Acetonitrile spilled into water is not expected to adsorb to sediments or suspended particulate matter. So, accumulation and magnification in river or lake bottoms will be insignificant.

Acetonitrile has a very low bioconcentration factor (BCF<1) and it is not expected to bioaccumulate in aquatic organisms.

Mitigation Measures for Releases to Water

Notify downstream water users and sewer and water treatment operators that a flammable, volatile chemical has been released into the water and that uptake could damage boilers, industrial equipment and treatment processes. They should cease water/sewer uptake or monitor for contamination. Consider supplying impacted water users with alternate supplies of fresh water.

Containment dikes, diversion ditches and temporary impoundments can be erected in low flow streams to contain contaminated water for subsequent treatment.

Recovered contaminated water can be treated by thermal, chemical or wet-air oxidative processes. Activated carbon and/or biological treatment are also effective on dilute wastewaters.

If deployed immediately after the spill, sorbent booms, pillows, etc. may contain some of the floating material. However, acetonitrile will be expected to go into solution very rapidly depending on the receiving water mixing zones and wave action. Also note that recovery materials will be contaminated and cannot be handled without appropriate personal

protective equipment.

Acetonitrile can be partially removed from water by aeration or sparging techniques. However, this will result in airborne vapor emissions that could create exposure hazards to people in the immediate area or downwind of the release site.

Remove, collect and inventory killed fish and other animals for subsequent proper resource damage assessment and disposal. Establish a monitoring program to track concentrations and impact to the receiving waters.

Effects of Releases to Air

Acetonitrile is highly volatile (vapor pressure: 87 mm Hg. @ 24°C, Henry's Law Constant: 2.9 E-5 atm m³/mole), so it is expected to volatilize quickly from spill surfaces, soils and water into the atmosphere creating potential inhalation concerns in the immediate spill area.

Vapors are heavier than air so they will accumulate in low spots and in confined areas creating exposure, fire and explosion hazards.

Vapors may be irritating to the eyes and skin and can cause toxic and potentially lethal effects via inhalation and skin absorption.

There are no published AIHA Emergency Response Planning Guidelines (ERPG) levels for acetonitrile. However, the following ERPG levels for acetonitrile should be considered.

- ERPG-3: 4000 ppm
- ERPG-2: 200 ppm
- ERPG-1: 60 ppm

Acetonitrile vapors are very stable in air and can be transported considerable distances downwind. The estimated atmospheric half-life is greater than 500 days.

Acetonitrile's persistence in the atmosphere is due largely to its unreactive nature. Photochemical smog studies show that acetonitrile is unreactive towards photochemically generated free radicals. It is also unreactive towards direct photolysis. Likely removal mechanisms in the atmosphere are reactions with oxidizing agents. OH radical and ozone reaction rates are estimated at 535 and 860 days, respectively.

Mitigation Measures for Releases to Air

After establishing an isolation zone, evaluate the need to protect individuals in downwind areas from airborne vapors. Vapors are stable in air and can travel considerable distances. Shelter-in-place instructions or evacuation of the affected public should be considered as conditions warrant. Conditions affecting public protection decisions include meteorological conditions, mitigation measures employed, timing and duration of release, release rate and proximity of unprotected individuals to release area.

Water fog or spray can be applied to vapors or fumes to help reduce downwind impact. Note that a water stream sprayed directly onto an acetonitrile pool can spread contamination and accelerate vapor formation.

Alcohol foam, (preferably AFFF/ATC) can be applied to the spill surface and will substantially reduce vapor release. If possible, use a 6% foam concentration and continue to apply as foam breaks down.

Note that both water fog and foam application will create contaminated run-off. The establishment of diversion ditches, dikes or other barriers can be used to contain contaminated water run-off for subsequent collection or disposal. Use plug rugs, plumbers putty, tarps and sand or other equipment to cover sewers and drains in the immediate spill

and run-off areas.

Effects of Releases to Soil

Acetonitrile is moderately volatile (vapor pressure: 87 mm Hg. @ 240 C) with a Henry's Law Constant of 2.9×10^{-5} atm m³/mole, so it is expected to volatilize from soils into the atmosphere creating potential inhalation concerns in the immediate spill area. Volatilization is expected to be major removal mechanism from soils, especially dry soils.

Acetonitrile adsorption to soils and organic sediments will be insignificant.

Due to its solvent properties and insignificant adsorption to soils, released acetonitrile is expected to have a fairly high mobility in soils. Spills and contaminated run-off, therefore, must be removed to avoid potential migration and contamination of groundwaters.

If released to soil, aerobic biodegradation is likely to occur with eventual formation of ammonia and carbon dioxide. Higher concentrations in soil are not expected to easily biodegrade due to acetonitrile's inhibitory effect on microorganisms.

Data suggest that photolysis and hydrolysis in soils are not major removal mechanisms.

Mitigation Measures for Releases to Soil

Attempt to minimize size of spill area as vapor evolution is proportional to pool size. Build dikes, barriers or run-off ditches to contain released acetonitrile.

If possible, place impervious plastic sheeting or tarps underneath release to contain and minimize spill to soil. [Note that acetonitrile is flammable and that plastic sheeting is known to discharge static electricity].

Alcohol foam, (preferably AFFF/ATC) can be applied to the spill surface and will substantially reduce vapor release. If possible use a 6% foam concentration and continue to apply as foam breaks down.

Note that both water fog and foam application will create contaminated run-off. The establishment of diversion ditches, dikes or other barriers can be used to contain contaminated water run-off for subsequent collection or disposal. Use plug rugs, plumbers putty, tarps and sand or other equipment to cover sewers and drains in the immediate spill and run-off areas.

Remove spilled acetonitrile, and contaminated water and soil as soon as possible to minimize infiltration into soils and groundwater. Accumulated liquid pools can be cleaned up by vacuum truck or by pumping into containers.

Absorbent materials such as commercial spill sorbents, spill pads, vermiculite, ground corncob, and clay, sand or saw dust can be used to remove small spills. All contaminated sorbents must be containerized for subsequent proper treatment and/or disposal.

Contaminated soil and debris can be removed by mechanical means such as bulldozer, loaders or shovel. Care must be taken to ensure flammable vapors are not present that can be ignited by motorized removal equipment. Also, all equipment employed during the cleanup must be decontaminated or properly disposed.

Small residual concentrations of acetonitrile in soils can be treated via bioremediation or application of a dilute neutralizing agent such as sodium bisulfite. However, consultation with local environmental authorities is recommended prior to using these methods.

Regulatory Information

The product and uses described herein may require global product registrations and notifications for chemical inventory listings, or for use in food contact or medical devices. For further information, visit <http://techservice.innovene.com>.

Health and Safety Information

The product described herein may require precautions in handling and use because of toxicity, flammability, or other consideration. The available product health and safety information for this material is contained in the Material Safety Data Sheet (MSDS) that may be obtained by calling +1-866-363-2454 (Toll Free-North America), or at <http://techservice.innovene.com>. Before using any material, a customer is advised to consult the MSDS for the product under consideration for use.

The Material Safety Data Sheet for this product contains shipping descriptions and should be consulted, before transportation, as a reference in determining the proper shipping description. If the material shipped by INEOS Nitriles is altered or modified, different shipping descriptions may apply and the MSDS of the original material should not be used.

For additional information, on samples, pricing and availability, please contact:

INEOS USA LLC
INEOS Customer Service Center
Marina View Building
2600 South Shore Boulevard
Ste. 250
League City, Texas 77573
USA
Toll-free: +1-866-363-2454

INEOS Europe Ltd
Clayhill,
Beechen Lane,
Lyndhurst, SO43 7DD
+44 (0)2380 287265

Phone Numbers

*Please use specific country number
depending from where you call:*

<u>Belgium/Netherlands</u>	<u>+32 (0)2 711 97 00</u>
<u>France</u>	<u>+33 (0)1 55 1741 85</u>
<u>Germany</u>	<u>+49 (0)69 5007 0188</u>
<u>Ireland</u>	<u>+353 (0)1 40732 74</u>
<u>UK</u>	<u>+44 (0)207 026 8321</u>
<u>Rest of the World</u>	<u>+44 (0)207 026 8322</u>
<u>FAX</u>	<u>+49 (0)221 3555 7528</u>

Technical information contained herein is furnished without charge or obligation, and is given and accepted at recipient's sole risk. Because conditions of use may vary and are beyond our control, INEOS USA LLC makes no representation about, and is not responsible or liable for the accuracy or reliability of data, nor for toxicological effects or Industrial Hygiene requirements associated with particular uses of any product described herein. Nothing contained in this document shall be considered a recommendation for any use that may infringe patent rights, or an endorsement of any particular material, equipment, service, or other item not supplied by INEOS USA LLC. The "Properties" and "Applications" listed in this document are not specifications. They are provided as information only and in no way modify, amend, enlarge, or create any specification or warranty, and ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED.

