

# XYLENE DISPERSANT TECHNICALDATA

## PROPERTIES:

**Benzene, toluene and xylene, the most widely used aromatic hydrocarbons, are very useful chemicals, however they are also extremely hazardous. have been Known to be both carcinogenic, some workers exposed long-term to benzene known to develop leukemia. These chemicals are also easily ignited, and while burning will produce carbon dioxide and carbon monoxide. Clearly it is essential that workers who must handle aromatic hydrocarbons be well trained in their hazard properties and safe handling techniques, and that emergency responders who must respond to an incident involving benzene, toluene or xylene be trained in proper response tactics.**

## Health effects:

**Xylenes can affect human health by being breathed in, being ingested, contacting skin or eyes, or passing through skin. High levels can cause dizziness, passing out, and death. Repeated exposure may damage bone marrow, causing low blood cell count.**
**Xylene exposure may cause problems with memory and concentration, and may damage a developing fetus.**
**Xylenes may also irritate the eyes, nose, and throat. They may cause stomach problems, drowsiness, staggering gait, corneal vacuolization, nausea, vomiting, abdominal pain, dermatitis, in coordination, and anorexia.**
**Xylenes have high acute and chronic toxicity to aquatic life.**

## Health Hazard Information

### *Acute Effects:*

**Human and animal data show that all xylene isomers or xylene mixtures produce similar effects, although specific isomers may not be equally potent in producing the effects. (1)**

**Acute (short-term) inhalation exposure to mixed xylenes in humans has been associated with dyspnea and irritation of the nose and throat; gastrointestinal effects such as nausea, vomiting, and gastric discomfort; mild transient eye irritation; and neurological effects such as impaired short-term memory, impaired reaction time, performance decrements in numerical ability, and alterations in equilibrium and body balance.**

**Acute dermal exposure in humans results in transient skin irritation and dryness and scaling of the skin.**

**Acute inhalation exposure to a mixture of toluene and xylenes resulted in more than additive respiratory and neurological toxicity.**

**Acute animal studies have reported effects on the respiratory, cardiovascular, and central nervous systems and the kidney from inhalation exposure to mixed xylenes.**

**Acute animal tests, such as the $LC_{50}$ and $LD_{50}$ tests in rats and mice, have shown mixed xylenes to have low to moderate toxicity from inhalation exposure and moderate toxicity from oral exposure.**

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## Health Hazard Information

### *Chronic Effects (Noncancer):*

**Chronic (long-term) exposure of humans to mixed xylenes, as seen in occupational settings, has resulted primarily in neurological effects such as headache, dizziness, fatigue, tremors, and incoordination. Labored breathing impaired pulmonary function, increased heart palpitation, severe chest pain, an abnormal EKG, and possible effects on the blood and kidney have also been reported.**

**Mixed xylenes have not been extensively tested for chronic effects, although animal studies show effects on the liver from inhalation exposure and effects on the blood, kidney, and CNS from oral exposure to mixed xylenes.**

### *Reproductive/Developmental Effects:*

**Several human studies examined exposure to organic solvents (including mixed xylenes) and developmental effects. However, no conclusions can be drawn from these studies because they all involved concurrent exposure to multiple chemicals.**

**Mixed xylenes have been shown to produce developmental effects, such as an increased incidence of skeletal variations in fetuses, delayed ossification, fetal resorptions, hemorrhages in fetal organs, and decreased fetal body weight in animals via inhalation exposure. Some studies observed maternal toxicity as well.**

### *Cancer Risk:*

**No information is available on the carcinogenic effects of mixed xylenes in humans.**

**An increase in tumors was not reported in an animal study of exposure to mixed xylenes via gavage (experimentally placing the chemical in the stomach). Other animal studies have reported equivocal results.**

**EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity.**

**Warning! Flammable liquid. Causes respiratory tract irritation. Causes skin irritation. May cause digestive tract irritation. This substance has caused adverse reproductive and fetal effects in animals. May cause central nervous system depression. Aspiration hazard. May cause severe eye irritation and possible injury. May cause liver and kidney damage. May cause blood abnormalities.**
**Target Organs: Blood, kidneys, central nervous system, liver, spleen, bone marrow.**

**Potential Health Effects**

**Eye: Causes severe eye irritation.**

**Skin: Skin absorption is slight. Prolonged formation may cause the formation of vesicles. Contact with the skin causes erythema, dryness, and defatting.**



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**Ingestion: Aspiration hazard. May cause irritation of digestive tract. May cause central nervous system depression, characterised by excitement, followed by headache, dizziness, drowsiness, and nausea.**

**Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause effects similar to those of acute inhalation.**

**Inhalation: Inhalation of high concentrations may cause central nervous system effects characterised by headache, dizziness, unconsciousness and coma. Prolonged exposure may result in dizziness and general weakness. Irritation may lead to chemical pneumonitis and pulmonary edema. May cause liver and kidney damage. Causes irritation of the mucous membranes. Exposure may cause blood abnormalities May cause hyperplasia of the bone and spleen.**

**Chronic: Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.**

## Health Effects

**Short-term exposure of people to high levels of xylene can cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; impaired function of the lungs; delayed response to a visual stimulus; impaired memory; stomach discomfort; and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations of xylene can also cause a number of effects on the nervous system, such as headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. People exposed to high levels of xylene for a short period of time have died. Most of the information on long-term exposure to xylene is from studies of workers employed in industries that make or use xylene. Those workers were exposed to levels of xylene in air far greater than the levels normally encountered by the general population. Many of the effects seen after their exposure to xylene could have been caused by exposure to other chemicals that were in the air with xylene.**

**Results of studies of animals indicate that large amounts of xylene can cause changes in the liver and harmful effects on the kidneys, lungs, heart, and nervous system. Short-term exposure to very high concentrations of xylene causes death in animals, as well as muscular spasms, incoordination, hearing loss, changes in behavior, changes in organ weights, and changes in enzyme activity. Long-term exposure of animals to low concentrations of xylene has not been well studied.**

**Information from animal studies is not adequate to determine whether or not xylene causes cancer in humans. Both the International Agency for Research on Cancer (IARC) and EPA have found that there is insufficient information to determine whether or not xylene is carcinogenic and consider xylene not classifiable as to its human carcinogenicity.**

**Exposure of pregnant women to high levels of xylene may cause harmful effects to the fetus. Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, decreased weight, skeletal changes, and delayed skeletal development. In many instances, these same concentrations also cause damage to the mothers. The higher the exposure and the longer the exposure to xylene, the greater the chance of harmful health effects. Lower concentrations of xylene are not so harmful. TOP**



# XYLENE DISPERSANT TECHNICALDATA

**Re: Xylene / Benzene Toxic Tort Help**
**On 11/25/99, John wrote:**

**I have been exposed to a mixture of Xylene / Benzene through my work. It was an odd situation in that I was working out of my house for a company that was about 100 miles away.**
**I was shown certain chemical-cleaning agents while being trained at the company, and told to use them. Sometimes I would get the cleaners directly from the company stash and sometimes I would get them from a local store with the same product.**
**I now have Aplastic Anemia, some mental impairment, depression, an eye injury resulting in permanent damage to my right eye, and more. This all occurred within a one year exposure time. 12/14/99:**

## HOW XYLENE ENTERS AND AFFECTS YOUR BODY

**Xylene enters your body rapidly when you breathe in its vapors. It can also be absorbed through your skin, particularly if the period of contact is lengthy. Overexposure to xylene most commonly affects your nervous system, respiratory system, and skin, as described below.**

**Nervous System: Xylene, like most organic solvents, affects your central nervous system (your brain) the same way drinking alcohol does. The effects listed below can begin to occur with exposure to air levels of about 100 parts per million (100 "ppm" "). They become more noticeable and serious as the level or length of time of exposure increases. Although these effects usually go away fairly quickly after your exposure stops, they can increase your chances of having an accident. Drinking alcohol within a few hours of exposure increases the likelihood of feeling these symptoms. This is because the effects of xylene and alcohol add together.**

**Effects of Xylene on the Nervous System**
**100-200 ppm nausea, headache**
**200-500 ppm feeling "high" dizziness, weakness, irritability, vomiting, slowed reaction time**
**800-10,000 ppm giddiness, confusion, clumsiness, slurred speech, loss of balance, ringing in the ears**
**>10,000 ppm sleepiness, loss of consciousness, death**

**Some studies suggest that repeated, frequent overexposure to organic solvents over months or years can have long-lasting and possibly permanent effects on the nervous system. The symptoms of these long-term effects include fatigue, poor coordination, difficulty concentrating, loss of memory, and personality changes, such as increased anxiety, nervousness, and irritability. We do not know the exposure levels at which such effects occur, and there have been no studies of workers exposed *only* to xylene.**
**Eyes, Nose, and Throat: If you are exposed to xylene in the air at levels above about 200 ppm (see "Legal Exposure Limits" on page 3), your eyes, nose, and throat can become irritated.**
**If liquid xylene is accidentally splashed in the eye, it stings and may damage the surface of the eye, which should heal within a few days.**

**Skin: Xylene, like other organic solvents, can dissolve your skin's natural protective oils. Frequent or prolonged skin contact can cause irritation and dermatitis (skin rash), with dryness, flaking, and cracking of the skin. Damaged skin may allow greater absorption of chemicals. Xylene easily penetrates most ordinary clothing (see "Reducing Your Exposure" on page 3) and can become trapped in ordinary gloves and boots. Xylene trapped in your clothing can cause burns and blistering.**



# XYLENE DISPERSANT TECHNICALDATA

**Lungs: Exposure to xylene at levels of 200 ppm or greater can irritate your lungs, causing chest pain and shortness of breath. Extreme overexposure (for example, in a confined space) can result in pulmonary edema, a potentially life-threatening condition in which the lungs fill with fluid. However, there is no evidence that repeated, low-level exposure has any long-term effects on the lung.**

**Liver and Kidney: At very high levels of exposure, xylene can injure the liver and kidneys, but this is extremely unlikely to happen without noticeable effects on the nervous system also. Generally, such liver and kidney damage is reversible.**
**Blood: There is no evidence that exposure to xylene affects blood cells in humans. Earlier reports of low red blood cell counts (anemia) may have been due to contamination of xylene with benzene.**

**Cancer: Xylene has been tested in laboratory animals, and did not cause cancer. We do not know whether xylene can cause cancer in humans.**

**Reproductive System: The effects of xylene on the reproductive system are not clearly known. When pregnant animals are exposed to very large amounts of xylene, the developing fetuses can be harmed. Levels of xylene high enough to kill some of the pregnant animals can cause birth defects in the offspring of the survivors. However, we do not know whether or not xylene can affect pregnancy or reproductive function in humans.**

**Xylene inhaled by a woman can reach a developing fetus and can contaminate her breast milk. We recommend that pregnant and nursing women minimize their exposure to xylene, just as they should minimize their exposure to alcohol, tobacco, and other drugs.**

**<u>Amoco Chemical Company Eliminates Xylene Through Material Substitution</u>**

**The Amoco Chemical Company eliminated the use of xylene as a process solvent. Xylene was replaced with Naphtholite,þ a low aromatic naphtha being used in other areas of the plant. The substance has similar aliphatic properties to xyleneCase**

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**What are the main health hazards associated with breathing in xylene?**

**The main effect of inhaling xylene vapour is depression of the central nervous system (CNS), with symptoms such as headache, dizziness, nausea and vomiting. Volunteers have tolerated 100 ppm, but higher concentrations become objectionable. Irritation of the nose and throat can occur at approximately 200 ppm after 3 to 5 minutes. Exposures estimated at 700 ppm have caused nausea and vomiting. Extremely high concentrations (approximately 10000 ppm) could cause incoordination, loss of consciousness, respiratory failure and death. In some cases, a potentially fatal accumulation of fluid in the lungs (pulmonary edema) may result. Symptoms of pulmonary edema, such as shortness of breath and difficulty breathing, may be delayed several hours after exposure. However, these effects are rarely seen since xylene is irritating and identifiable by odour at much lower concentrations.**

**The only reported death resulted from exposure to xylenes (unspecified isomer composition and unknown concentration) in a confined space. Reversible Liver and kidney damage has been reported in cases of severe xylene exposure. Results of short- term studies on human volunteers indicate that xylenes can cause neurobehavioural effects such as impaired short-term memory and reaction time (300 ppm xylene, with exercise) and alterations in body balance (65 to 400 ppm m-xylene). Exposure to 300 or 400 ppm xylene or 65 to 150 ppm p-xylene have not had similar effects. This variation in results is probably due to differences in the effects being studied, exposure conditions, development of tolerance and total xylene uptake (which increases during exercise).**

**Health :What happens when xylene comes into contact with my skin?**

**Studies with xylene isomers have shown irritation, redness and a burning sensation can result from contact. These effects are reversible shortly (usually within 1 hour) after the contact stops. Repeated or prolonged exposure to xylene can defat the skin resulting in dermatitis (red, dry, itchy skin).**
**Xylene liquid or vapour can be absorbed through the skin, but not as readily as when inhaled or ingested. Significant harmful effects are not expected by this route of exposure.**

**Health: Can xylene hurt my eyes?**

**The liquid is probably a mild irritant, based on animal information. Eye irritation has been reported at vapour levels as low as 200 ppm. Corneal vacuoles (pockets of fluid or air in the cornea) have also been reported following exposure to undefined vapour concentrations. This effect was reversible within 8 to 11 days for 7 of 8 workers.**

**Health: What happens if xylene is accidentally swallowed (enters the digestive system)?**



# XYLENE DISPERSANT TECHNICALDATA

**Based on animal information, xylene is only slightly toxic by ingestion. Ingestion of large amounts is likely to cause CNS effects such as dizziness, nausea and vomiting. In one case, ingestion of food probably contaminated with xylene caused pulmonary edema, liver impairment and coma. The man recovered within 2 hours after treatment. Ingestion is not a common route of occupational exposure.**
**Although there are no case reports, xylene may be aspirated, based on its physical properties (viscosity and surface tension). Aspiration is the inhalation of a material into the lungs during ingestion or vomiting. Severe lung irritation, damage to the lung tissues and death may result.**

**Health: What are the long term health effects of exposure to xylene?**

**SKIN: Repeated contact can produce dermatitis (dryness and cracking) due to degreasing action.**

**SKIN SENSITIZATION: Skin sensitization was not produced in any of 24 volunteers. There is one case report of a person developing an allergic skin reaction (contact urticaria) following exposure to xylene (unspecified composition) vapour. The person subsequently tested positive in a patch test. No information was provided regarding previous history of allergies. No conclusions can be drawn regarding the potential for xylene to produce allergic skin reactions, based on this single case report.**
**This is information gathered on March 25 2000**

**NERVOUS SYSTEM EFFECTS: Long-term xylene exposure may cause harmful effects on the nervous system, but there is not enough information available to draw firm conclusions. Symptoms such as headaches, irritability, depression, insomnia, agitation, extreme tiredness, tremors, and impaired concentration and short-term memory have been reported following long-term occupational exposure to xylene and other solvents. This condition is sometimes generally referred to as "organic solvent syndrome". Unfortunately, there is very little information available which isolates xylene from other solvent exposures in the examination of these effects. Other study deficiencies include inadequate reporting on the duration of exposure and the exposure levels, and poor matching of controls.**
**In a recent study, 175 employees were exposed to an average xylene concentration of 21 ppm for an average of 7 years. Subjective symptoms such as anxiety, forgetfulness, inability to concentrate and dizziness were reported. Xylenes accounted for greater than 70% of the total exposure.) This study is also limited by factors such those described above.**

**BLOOD EFFECTS: Historical reports sometimes associate xylene exposure with certain blood effects, including leukemia, which are now known to be caused by benzene. Uncontaminated xylene is not known to cause these effects. Reduced blood platelet counts were observed in 12 of 27 men exposed to xylene (unspecified composition) at a level up to 200 ppm. When exposure stopped, platelet counts returned to normal. There is insufficient information to draw any conclusions from this study.**

**LIVER AND KIDNEY EFFECTS: A number of case reports and occupational studies have suggested that liver and kidney damage may result from long-term occupational exposure to xylene. However, it is not possible to attribute these effects directly to xylene exposure because generally there was exposure to other chemicals at the same time, particularly other solvents, and there was no information provided on the exposure levels or duration of exposure.**
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**Health: Will xylene cause cancer?**

**There are two case-control studies investigating the relationship between cancer and xylene exposure. However, in both studies, there was exposure to other chemicals and the number of cases was limited. The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity OF xylene in humans. No conclusions can be drawn from the available animal information. )**

**Health: Will xylene cause any problems with my reproductive system?**

**An increase in menstrual disorders has been reported in women exposed to organic solvents such as benzene, toluene and xylene. It is not possible to attribute these effects to xylene in particular.**

**Health: Will xylene cause effects on the fetus/unborn baby?**

**Several human population studies have suggested a link between exposure to organic solvents (including xylene) and increased occurrence of miscarriages or birth defects in children. However, in the majority of cases, there was exposure to a variety of solvents at the same time, exposures were ill-defined, and the number of cases examined was small.**

**Overall, no conclusions can be made on the effects of exposure to xylene on the unborn child because of the inadequacy of the available information.**
**Xylene has produced fetotoxic effects (delayed ossification and behavioural effects) in animals, in the absence of maternal toxicity. Animal information suggests that xylene is not teratogenic or embryotoxic at exposure levels that are not harmful to the mother.**

**Health: Will xylene act in a synergistic manner with other materials (that is, will its effects be more than the sum of the effects from the exposure to each chemical alone)?**

**Exposure to related solvents, such as benzene, toluene and ethanol (alcohol) slows the rate of clearance of xylene from the body, thus enhancing its toxic effects. Exposure to xylene in combination with other solvents has had an additive effect with respect to harming the hearing of rats.**

**Health: Is there potential for xylene to build-up or accumulate in my body?**

**The three xylene isomers are readily absorbed by inhalation and ingestion and are widely distributed throughout the body. A small amount may be absorbed through the skin. Xylene is largely broken down by the liver and most of the absorbed material is rapidly excreted in the urine as breakdown products. Smaller amounts are eliminated unchanged in the exhaled air. There is low potential for accumulation.**

**International: Does xylene meet any of the Canadian WHMIS hazard criteria?**

**Xylene meets the Canadian WHMIS criteria for class(es):**
**B2 - Flammable and combustible material - Flammable liquid**
**D2A - Poisonous and infectious material - Other effects - Very toxic**
**D2B - Poisonous and infectious material - Other effects - Toxic**

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