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Fact Sheet

Hazard Evaluation System and Information Service

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Xylene

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Health Hazard Summary: *Overexposure to xylene most commonly depresses the central nervous system, producing headaches, nausea, dizziness, and drowsiness, and irritates the eyes, nose, throat, and skin.*

HOW TO FIND OUT IF YOU ARE WORKING WITH XYLENE

Xylene is a clear, light-colored or colorless, flammable liquid which evaporates quickly. Its odor is strong and sweetish like other aromatic solvents. Xylene is also called "xylol," "dimethylbenzene," or "mixed xylenes."

Xylene may be found in:

solvents for gums, resins, and rubber
cleaners and degreasers
paints, lacquers, and varnishes
adhesives, cements, and epoxy resins
inks and dyes
aviation gasolines

Xylene is often used in the manufacture of:

other chemicals
plastics and synthetic fibers
insecticides and other pesticides
insect repellents
leather goods

YOUR RIGHT TO KNOW: Under the California and federal Hazard Communication Standards (California *GISO 5194* and U.S. *29 CFR 1910.1200*, your employer must tell you if you are working with any hazardous substances, including xylene, and must train you to use such substances safely. If you think you may be exposed to hazardous chemicals at work, ask to see the Material Safety Data Sheets (MSDSs) for the products in your work area.

Your employer is required to have an MSDS for any workplace product that contains a hazardous substance, and must make the MSDS available to employees on request. An MSDS lists the hazardous chemical contents of a product, describes its health and safety hazards, and gives methods for its safe use, storage, and disposal. The MSDS should also include information on fire and explosion hazards, reactivity, first aid, and procedures for handling leaks and spills.

This Fact Sheet is an aid for worker training programs. It does not take the place of a Material Safety Data Sheet.

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" - see "Legal Exposure Limits" on page 3). 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.

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.

TESTS FOR EXPOSURE AND MEDICAL EFFECTS

Certain tests can estimate the amount of xylene that your body has absorbed during *recent* exposure. However, xylene is quickly eliminated from the body. We do not recommend that these tests be used on a routine basis. For further information, health professionals should consult the American Conference of Governmental Industrial Hygienists' (ACGIH's) Documentation of Biological Exposure Indices (BEIs).

We generally recommend that workers who are frequently exposed to xylene or other hazardous substances receive a complete physical examination, including an occupational and medical history, at the beginning of employment. Workers should also have periodic follow-up examinations.

LEGAL EXPOSURE LIMITS

California's Division of Occupational Safety and Health (DOSH, or "Cal/OSHA") makes and enforces regulations for chemical exposure in the workplace. Cal/OSHA has adopted a Permissible Exposure Limit (PEL) for the amount of xylene in your breathing zone. The PEL for xylene is 100 parts of xylene per million parts of air (100 parts per million, or 100 "ppm"). This PEL is equal to 435 milligrams of xylene per cubic meter of air (435 mg/m³). Your exposure may legally be above 100 ppm at times, but only if it is *below* 100 ppm at other times, so that your **average** exposure for any 8-hour work-shift is 100 ppm or less. Cal/OSHA has also adopted an "excursion" limit of 200 ppm, which may be exceeded for no more than 30 minutes during any 8-hour shift, and a "ceiling" limit of 300 ppm, which must *never* be exceeded for any period of time. These limits are set at levels intended to protect against effects on your nervous system and your eyes, nose, and throat.

If you are working with xylene and think that you may be overexposed, talk to your supervisor and/or your union. If any worker might be exposed to a substance at more than the legal exposure limit, the employer must measure the amount of the chemical in the air in the work area (Cal/OSHA regulation *GISO 5155*). You have the right to see the results of such monitoring relevant to your work (*GISO 3204*).

You also have the right to see and copy your own medical records and records of your exposure to toxic substances. These records are important in determining whether your health has been affected by your work. If your employers have such records, they must keep them and make them available to you for at least 30 years after the end of your employment.

You should not rely on your sense of smell to warn you that you are being overexposed to xylene. Although many people can smell xylene when the concentration in the air is as low as 1-20 ppm, other people may not smell it even at levels above 100 ppm. Moreover, your sense of smell can become dulled or fatigued by strong odors. Measuring the amount of a substance in the air is the only reliable way to determine the exposure level.

REDUCING YOUR EXPOSURE

Your employer is required to protect you from being exposed to chemicals at levels above the legal limits. For information about how Cal/OSHA and Cal/OSHA Consultation Service can help you and your employer, see the "Resources" section on page 4.

Engineering Controls: Whenever possible, employers must use engineering and administrative controls rather than personal protective equipment to prevent overexposure. Engineering control methods include installing ventilation, changing the work process, and changing work practices. Containers and vats should be tightly covered to prevent evaporation. Certain work processes can be isolated, enclosed or automated to reduce exposures.

Local exhaust ventilation systems ("hoods") are the most effective type of ventilation control. Exhaust ventilation systems capture contaminated air at its source before it spreads into the air in your breathing zone. Cal/OSHA's *GISO 5154* has design requirements for the local exhaust ventilation of dip tanks containing xylene. *GISO 5153* has design requirements for the ventilation of spray booths where xylene-containing materials are sprayed.

Personal Protective Equipment: When engineering controls cannot sufficiently reduce exposures, a respirator must be worn and a respiratory protection program must be developed by the employer, as outlined in Cal/OSHA regulations (*GISO 5144*). An industrial hygienist or other knowledgeable person should be consulted to ensure that the equipment is appropriate and is used correctly.

If frequent or prolonged skin contact with xylene is unavoidable or if splashing may occur, other protective equipment such as gloves or faceshields must be worn. Protective clothing should be made of a material resistant to xylene, such as polyvinyl alcohol. Even the most resistant materials

will be penetrated quickly and should be replaced often.

Substitution: The most effective way to reduce hazardous exposures is to substitute safer chemicals for more toxic ones. However, the health and safety hazards of the substitute must also be carefully considered to ensure that it is actually safer.