



New Jersey Department of Health
**HAZARDOUS SUBSTANCE
FACT SHEET**

Common Name: **TOLUENE**

CAS Number: 108-88-3
DOT Number: UN 1294

RTK Substance number: 1866
Date: May 1986 Revision: Nov. 1992

HAZARD SUMMARY

- * Toluene can affect you when breathed in and by passing through your skin.
- * Toluene may cause mutations. Handle with extreme caution.
- * It may damage the developing fetus.
- * Exposure can irritate the skin, nose, throat and eyes. Higher levels can cause you to feel dizzy, lightheaded, and to pass out. Death can occur.
- * Repeated exposures can damage bone marrow, causing low blood cell count. It can also damage the liver and kidneys.
- * Toluene can cause slowed reflexes, trouble concentrating, and headaches.
- * Prolonged contact can cause a skin rash.
- * Toluene is a **FLAMMABLE LIQUID** and a **FIRE HAZARD**.

IDENTIFICATION

Toluene is a colorless liquid with a sweet, strong odor. It is used as a solvent and in aviation gasoline, making other chemicals, perfumes, medicines, dyes, explosives, and detergents.

REASON FOR CITATION

- * Toluene is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEPE, NFPA, HHAG and EPA.
- * This chemical is on the Special Health Hazard Substance List because it is **FLAMMABLE**.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting air samples. Under OSHA 1910.20, you have a legal right to obtain copies of sampling results from your employer. If you think you are experiencing any work-related health problems, see a doctor trained to rec-

ognize occupational diseases. Take this Fact Sheet with you.

- * **ODOR THRESHOLD = 2.9 ppm.**
- * The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is 100 ppm averaged over an 8-hour workshift and 150 ppm not to be exceeded during any 15 minute work period. (Final Rule, January 1989).

NIOSH: The recommended airborne exposure limit is 100 ppm averaged over an 8-hour workshift and 200 ppm not to be exceeded during any 10 minute work period.

ACGIH: The recommended airborne exposure limit is 50 ppm averaged over an 8-hour workshift.

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

- * Toluene may cause mutations. All contact with this chemical should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to Toluene and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Toluene to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Toluene:

- * Exposure can irritate the skin, nose, throat and eyes. Higher levels can cause you to feel dizzy, lightheaded, and to pass out. Death can occur.
- * Lower levels can cause trouble concentrating, headaches, slowed reflexes, loss of appetite and nausea.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Toluene and can last for months or years:

Cancer Hazard

- * Toluene may cause mutations (genetic changes).
- * According to the information presently available to the New Jersey Department of Health, Toluene has been tested and has not been shown to cause cancer in animals.

Reproductive Hazard

- * Toluene may damage the developing fetus.

Other Long-Term Effects

- * Repeated exposure can damage bone marrow, causing low blood cell count.
- * Prolonged contact can cause drying and cracking of the skin, and a rash.
- * Repeated Toluene exposure can cause liver and kidney damage, and may cause brain damage.

MEDICAL

Medical Testing

For those with frequent or potentially high exposure (half the TLV or greater, or significant skin contact), the following is

recommended before beginning work and at regular times after that:

- * Urinary Hippuric acid excretion (at the end of shift) as an index of overexposure.

If symptoms develop or overexposure is suspected, the following may be useful:

- * Exam of the nervous system.
- * Liver and kidney function tests.
- * Complete blood count.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

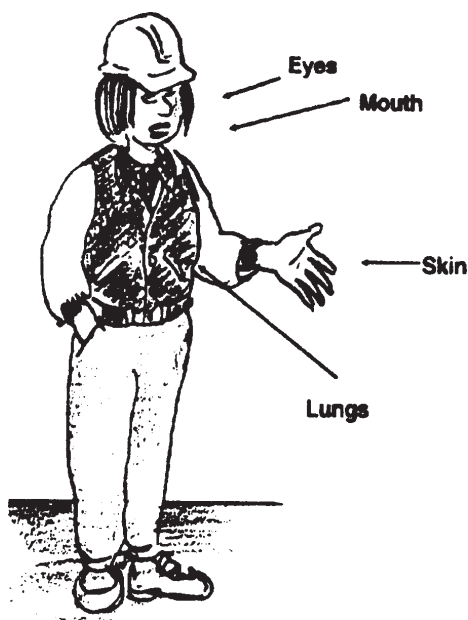
In addition, the following controls are recommended:

- * Where possible, automatically pump liquid Toluene from drums or other storage containers to process containers.
- * Specific engineering controls are recommended for this chemical by NIOSH. Refer to the NIOSH criteria document: *Occupational Exposure to Toluene #73-11023*.

How Hazardous Chemicals Enter Your Body

The four basic ways toxic chemicals enter your body are:

- **Absorption:** through the skin, for instance, when your hands or clothes become soaked with a solvent.
- **Absorption:** through the eyes.
- **Inhalation:** breathing in through the lungs.
- **Ingestion:** through the mouth with food or from chemicals on your hands.



The skin and lungs are the most common routes of poisoning in industrial facilities.

Direct contact with some chemicals can result in serious damage. Some chemicals burn or irritate the body at the point of contact. For example, sulfuric acid burns the skin and eyes when it is in liquid form. It burns the nose and lungs when it is a mist. Sulfuric acid is found in the batteries of cars and forklifts.

Letting it soak in is worse!

Some chemicals can pass right through the skin and enter the bloodstream. They are carried throughout the body, to the target organs where they cause the most harm. Chemicals can damage your brain, liver, kidneys . . . in fact, any part of your body.

Source: Dangerous Properties of Industrial Materials, Irving Sax, 7th edition.

Will It Get You Now Or Later?

Toxic chemicals can make you sick soon after exposure or they can take years to cause disease. The two words that describe this are --

ACUTE and CHRONIC Health Effects

Acute Effects

The word “acute” means that health effects are felt at the time you are exposed to a substance or shortly after.

- **Hydrogen chloride** irritates your lungs, nose, and throat right away when you breathe it in.
- **Caustic soda** corrodes the skin. At first it makes your skin feel slippery. A few minutes later, you feel the burning, when the damage is already done.
- **Carbon monoxide** from gas-powered hi-lo trucks that are not tuned binds up your red blood cells. This starves your body of oxygen. It acts almost immediately, and if enough red blood cells are bound up, you won't know it, because you'll be dead.
- **Cutting fluids** can cause painful rashes.
- **Freon** can make you feel high. At higher levels, freon can also cause irregular heart beats, which can bring on a heart attack, even in a younger person.

Fact Sheet #2, continued

Chronic Effects

The word “chronic” means that the disease will not be seen for quite a while after you are exposed. It is common when you are exposed to a small amount of a substance over a long period of time.

- **Welding fumes** can cause lung cancer.
- **Solvents** can cause nerve damage and early senility, another chronic disease.
- **Isocyanates** can cause allergic reactions such as skin allergies and asthma.

Acute or Chronic – Related to Dose

Many chemicals will cause both short-term and long-term health problems. It depends on how much you take into your body. A large dose all at once (working with a solvent in a confined space) will probably cause an acute effect. A small dose, day in and day out for a long time may cause a chronic effect.

A **LARGE DOSE** of PCBs **causes** a skin disease called **CHLORACNE.**

Over a long period of time,
SMALL AMOUNTS of
PCBs **cause** **LIVER CANCER.**

Respirators: A Last Ditch Control

A respirator is a mask that fits your face tightly. It is made to protect your lungs. Lee wore an “air purifying respirator” — the kind that has cartridges which are supposed to clean out some of the chemicals in the work air as the worker breathes.

Respirators often fail to protect workers from being exposed to toxic chemicals.



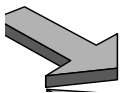
Here are some of the major problems –

- Respirators do not stop chemicals from being absorbed through your skin.
- Respirators are not “one-size-fits-all” items. You have to be fit-tested to make sure the respirator you use fits your face. Every time you put the respirator on, you have to readjust it to make sure the mask still fits.
- Respirators often leak, letting in contaminated air. Even respirators that fit your face can leak.

Fact Sheet #3, continued

- Respirators do not protect against all chemicals. You should **NOT** wear an air-purifying respirator with chemicals such as MDI, TDI, and carbon monoxide. These are common chemicals at UAW facilities.
- You have to know what chemical you are working with in order to pick the proper respirator and the right type of cartridge or filters.
- You have to change the cartridges or filters frequently. If not, they will not keep out the chemicals in the air.
- Respirators must be washed after **EVERY** use, and stored in a clean, dry place, away from the work area.
- Respirators make it harder to breathe, which puts extra stress on the heart and lungs. They are also hot and uncomfortable.

The Bottom Line



It is much more effective to prevent the chemical from getting out into the work area than to use a respirator. A better method to control chemicals is to use “local exhaust ventilation” which sucks up the vapors or mists near the source.

Fact Sheet #3, continued

Success Stories

UAW Local 683 at FMC Corporation in Minneapolis, Minnesota

The local union was successful in persuading the company to stop using 1,1,1 trichloroethane as a vapor degreaser to clean parts. They switched to hot detergent washes instead, a much healthier way of cleaning the parts.

UAW Local at Winter Seal Company, Michigan

The local union found a substitute for the xylene that the company had used to clean window frames. When the workers found out that xylene causes reproductive damage, they insisted on looking for a safer product. The company switched to WindexTM -- ***a much safer and cheaper product.***

Your Right to Know: OSHA's Haz Com Standard

Since OSHA's Hazard Communication (Haz Com) Standard 1910.1200 was adopted in 1986, workers across the U.S. have the right to know about chemicals they use on the job. The standard is more often called the **Worker Right to Know law**.

This law requires chemical manufacturers to identify the hazards of the chemicals they make and pass this information on to the buyers of these chemicals. The purchasers must then pass the information on to the employees who work with or around the chemicals.



Fact Sheet #4, continued

Employer Responsibilities under the Right to Know Law:

- 1.** Develop a written hazard communication program.
- 2.** Make sure that all chemical containers are labeled.
- 3.** Collect and organize chemical information in the form of Material Safety Data Sheets (MSDS). MSDS must be available to all workers on all shifts.
- 4.** Provide training to workers on the dangers of their specific jobs.

A more detailed description of each of these duties follows on the next few pages.

Employer Responsibilities under the Right to Know Law:

1. Develop a Written Hazard Communication Program

Employers must write a policy that describes how they will get information about the chemicals and get it to workers. Worker and union representatives have the right to see and copy the policy. The written program must include:

- A list of all hazardous materials at the worksite.
- How Material Safety Data Sheets (MSDS's) will be secured for all materials before they are used in the workplace.
- Where MSDS will be stored and how they can be obtained by workers.
- How workers will be informed about the hazards of jobs that are not done on a routine basis, such as cleaning tanks or pits, or maintenance on pipelines.

Fact Sheet #4, continued

2. Make sure that all chemical containers are LABELED.

All products that contain hazardous chemicals must have a label on their container. This includes bags, tanks, 55-gallon drums, small pails, even spray bottles. The label must identify three items:

- a. **The name of the product** — must be the same name that appears on the MSDS for this product.
- b. **Hazard warning** — all health and safety warnings, including target organs, the part of your body that could be affected by this product.
- c. **Name and address** of the manufacturer.



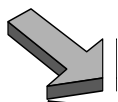
Fact Sheet #4, continued

3. Collect MATERIAL SAFETY DATA SHEETS (MSDS's) and make them available to all Workers

MSDS's -- fact sheets that give specific information on the hazards of the product and how to handle it.

Every product with hazardous chemicals must have an MSDS on file in the work area. Even products such as contact cement or drain cleaner must have an MSDS on file. According to OSHA, MSDS's must be:

- Readily accessible — you must be able to see the MSDS during the work shift that you ask for it.
- Kept up to date. If the date on the MSDS is more than three years old, ask for a more recent version.



Workers and union representatives also have the right to get a copy of any MSDS.

Fact Sheet #4, continued

4. Provide Training for Workers.



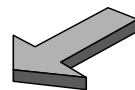
Training is probably the most important part of the law.

Employers must train workers on:

- The Right to Know law
- The specific hazards of the chemicals they work with or around
- How to use the chemicals safely, including what protective equipment is needed
- Where and how to find and use MSDS's at the workplace
- What to do in an emergency spill or leak

Workers must be trained **before** they start working with a product. Your employer must also provide training when new products are brought into the workplace, or when the work process changes to create new hazards. Knowing about the chemicals you work with is a valuable tool to use in the process of controlling health and safety hazards.

The UAW strongly recommends
refresher training on the Right-to-
Know every year for every workplace.



What's on a Label?

OSHA's Hazard Communication Standard Requires Labels

OSHA says that containers that hold hazardous materials have to be clearly labeled. The label has to tell you:

1. The **name** of the product (which has to match the name on the Material Safety Data Sheet for that product)
2. Specific **health and safety hazards** of the product, including the **target organs** that are affected in the long term.
3. The name and address of the **manufacturer or supplier** — where you can get more information.

Fact Sheet #5, continued

All containers that hold hazardous materials must be labeled — bags, buckets, barrels, cylinders even process containers such as plating tanks. **EXCEPT** pipes. OSHA says that pipes carrying hazardous materials have to be identified in some way, but does not require this same kind of label.

The UAW strongly recommends that pipes be clearly labeled just like any other container of hazardous products.

FREIBORNE INDUSTRIES INC.
COATINGS DIVISION
1212 E. Maple Road
Troy, MI 48083
313-588-5830

Formlube
1
NET 200

Non-Hazardous Material
Lubricating, Cutting
Drilling Compound
For Industrial Use Only

0104309101
CAUTION

CONTAINS:
Do not get in eyes, on skin, on clothing.
Do not breathe vapor or mist or dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.

Spill or leak procedure
Shovel or use absorbent material to pick up.
Place in plastic or polylined steel drum for reclaim
or disposal in accordance with gov. regulations.

First Aid:
Eye Contact: Flush with water for 15 minutes and
get medical attention.
Skin Contact: Wash thoroughly with water.
Swallowing: Drink large quantities of milk or water.
DO NOT INDUCE VOMITING. Get medical attention.

How good is this label?

Not very! This label does not give you a clear idea of the hazards of this product. The label does not tell you what specific parts of your body could be harmed.

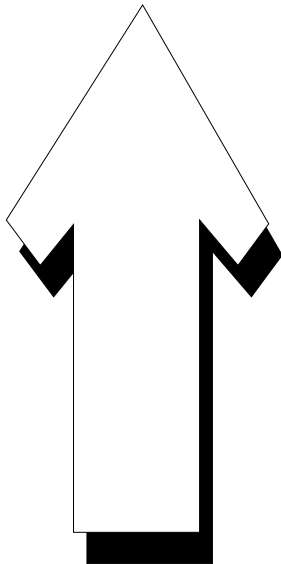
Making Work Safer

A control is any measure taken to keep a hazard from hurting you. The most effective controls do something about the source of the problem.

For instance, getting rid of lead from paint has reduced exposure to a chemical that can cause serious nerve damage. The controls that often **don't** work are ones that are a long way from the source of the hazard.

Health & Safety Controls

Most Effective



Least Effective



Elimination or Substitution

(use a hot water and detergent mixture to wash parts instead of MEK or 1,1,1 trichlor.)



Engineering Controls

(ventilation, or enclosures, for example)



Warnings

(signs, horns, alarms)



Training and Procedures

(locking out energy sources)



Personal Protective Equipment

(gloves, respirators, safety shoes)