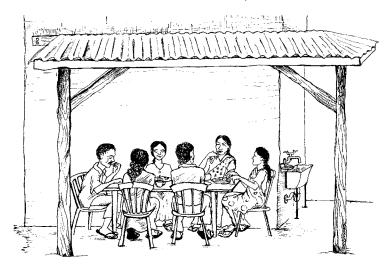
GOOD FOOD AND A CLEAN PLACE TO EAT

Some factories have a cafeteria or dining hall where food is prepared and served to workers. But workers sometimes report that factory food makes them sick instead of healthy. If the company does not provide a nutritious meal, it is the boss's responsibility to make sure workers have a clean place to store food and an area where they can sit and rest while they eat. The eating area should be away from work tables, machines, chemicals, dust, and factory noise.



Eating outdoors in the shade gives workers a chance to rest, relax, and breathe fresh air.

TAKING ACTION FOR REST BREAKS AND MEALS

In some countries, factory workers are entitled by law to regular rest breaks during their shift. In Bangladesh, for example, the law limits the regular work day to 9 hours and requires at least a 1-hour break for more than 6 hours of work, a 30-minute break for more than 5 hours of work, and either a 1-hour break or two 30-minute breaks for more than 8 hours of work.

For ideas about using labor laws to pressure for changes in working conditions, see 'xxx' on pages xx to xx. For more information about organizing for decent working hours and no forced overtime, see 'Overwork: long hours for low pay' on pages xx to xx.

You can also organize to:

- **Demand a free or low-cost meal for all workers.** A worker committee can also make sure the food is fresh and well-cooked, and report problems to the boss.
- Make sure the eating utensils and eating areas are kept clean and free of pests. Local governments often have an agency that inspects restaurants, food vendors, and factories for safety and sanitation. If the factory food or dining hall is dirty, ask the agency to make an inspection.

Work Dangers Draft — February 2006



Workers demand better food and win a new union — Mexico

When a Korean company opened a new garment factory in Puebla, Mexico, the owners promised workers "model" conditions, including pay above minimum wage, 2 meals, transportation, and representation by a local union. But the company did not keep these promises. The pay was low, the work hours long, and the bosses harassed and

threatened workers who were slow to meet production quotas. Worst of all, the food in the factory dining hall was often spoiled or raw, full of worms, and served on dirty plates. Many workers became sick and some were hospitalized for food poisoning.

Some of the workers on the sewing line asked the union representative to do something about the food. When conditions



did not improve, 20 of the workers called a meeting to discuss the problem with other workers. The union representative also came to that meeting. The workers decided to boycott the dining hall for 1 day to demand better food.

On the agreed day, no workers went to the dining hall. When the bosses asked the union representative why nobody was eating, he blamed the workers who had called the meeting. After the boycott, the company fired 5 workers and refused to give any reason. This showed the workers that the union did not really represent them. More than 600 of the 850 workers in the factory then went on strike and occupied the factory, demanding:

- fresh, safe, well-cooked food in the factory dining hall.
- · a new union chosen by the workers.
- · reinstatement of the fired workers.

The striking workers were violently evicted by police a few days later, but the campaign for a democratic union continued for 9 months. The workers were supported by allies in the United States, where most of the clothes from the factory are sold. These allies pressured the Korean company, the Mexican government, and the brand-name buyers of the clothes --including Nike and Reebok-- to accept a new union as required by Mexican law and ILO conventions. The workers finally won, and their union became the first independent union in a garment factory in the state of Puebla.



Falls and falling objects

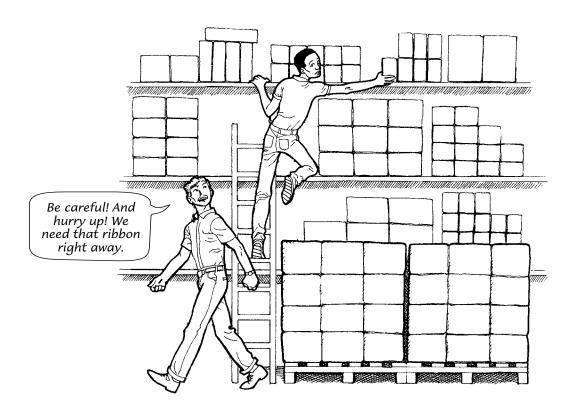


Do workers stand on ladders, chairs, or crates to do their jobs?

Have workers been hit by material falling from high shelves or stacks?

Do workers trip on uneven floors, loose cables, or debris?

When a worker is hit by a tool or container falling from above, people usually say, "He had an accident." When a worker falls from a high place, or trips and falls on the floor, he is often blamed for being careless or clumsy. But these "accidents" are not the worker's fault, and they can easily be prevented.



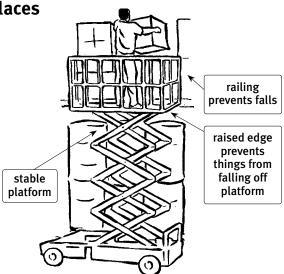
Who is to blame when this worker falls?

Work Dangers Draft — February 2006

Preventing falls from high places

Working above the floor on a stable platform is the best way to prevent a worker from falling, and to prevent tools or parts from falling into the work area below. A platform can be moveable or fixed in one place. The platform should be large enough for a worker to do his job with room for tools and materials.

A moveable, elevated work platform is safer than a ladder.



PREVENTING INJURIES FROM FALLING OBJECTS

A worker can be severely injured or killed by tools or materials falling or dropped from above. To prevent things from falling onto workers, make sure:

• work areas and walkways are not directly below overhead rail systems, platforms, and stored materials.

• **stacks of materials and containers** will not tip over from too much weight or uneven stacking.

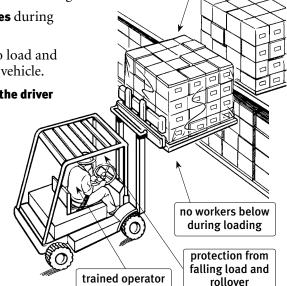
• **shelves and raised storage platforms are strong enough** to hold the materials stored on them. Weight limits should be posted and followed to prevent overloading.

 no workers are below high shelves during loading and unloading.

• **lift truck operators are trained** to load and unload within the limits of the vehicle.

 vehicles are equipped to protect the driver from falling loads.

• workers wear hard hats under elevated work areas. A hard hat can reduce the seriousness of some injuries caused by falling materials hitting your head, but will not protect you from larger objects or protect your neck and body from being injured.



stable pallet

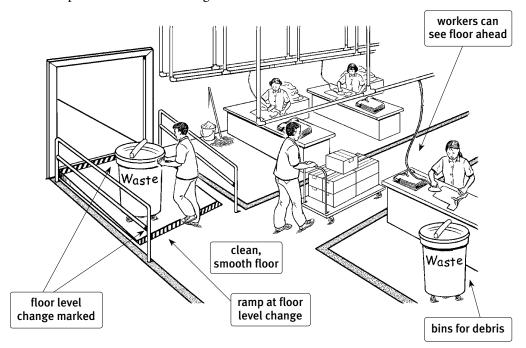
of materials

Preventing slips, trips, and falls on the floor

Uneven floors, holes in the floor, changes in floor levels, wet floors, and cables and debris lying on the floor cause workers to slip, trip, and fall.

Many falls can be prevented by:

- · repairing rough floors.
- **marking changes in floor level,** such as stairs and ramps, with paint or different surfacing, so workers can see them clearly.
- · cleaning up water, oil, and chemical spills immediately.
- · regularly cleaning up debris, dirt, and dust.
- **keeping loose cords out of the way** by fastening them to the wall or floor with tape or a smooth covering.



Trips, slips, and falls are common and can be prevented.



What do you think?

Are there "accidents waiting to happen" in your factory? How can you prevent workers from falling or being struck by a falling object?

Motor vehicle injuries



Have workers been struck by motor vehicles, such as lift trucks, in the factory?

Does the boss enforce vehicle safety rules?

Most motor vehicles used in factories are large, heavy machines with moving parts. The motors get hot and run on flammable fuels. Exhaust from the burned fuel is dangerous to breathe. In addition to these dangers, vehicles in factories carry heavy loads and may move around in areas where workers stand and walk.

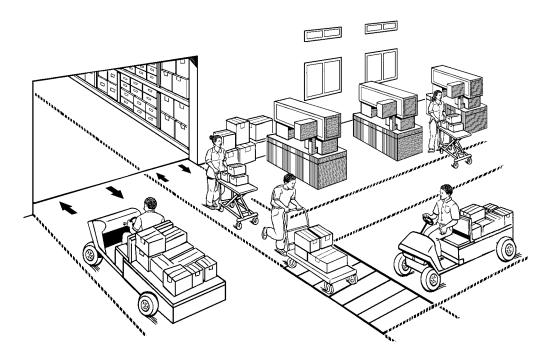
The dangers from motor vehicles are the same in and outside factories. Injuries from motor vehicles on roads and in factory zones can be prevented by separating vehicle traffic from walkways, and by making sure vehicles are operated safely.



Protecting people from vehicles

More injuries happen when vehicles take over the spaces where people normally walk. These are some ways workers can be protected from vehicle traffic in and around a factory:

- Walkways are clearly marked and separated from vehicle traffic areas.
- In areas of busy vehicle traffic, separate lanes are marked for vehicles traveling in different directions.
- In areas where vehicle traffic crosses walkways, vehicles must stop and give people walking the right-of-way.
- Walkways are wide enough for the number of people using them.
- Vehicles have enough space to move around work areas without colliding with machines, equipment, stacks of materials, other vehicles, or workers.
- Walkways are kept free of parked vehicles, stored supplies, and debris.
- Vehicles must park in designated areas where they do not block lanes or walkways.
- Drivers and people walking can see ahead clearly. Stored materials, large machines, or other objects do not block their view.



Work Dangers Draft — February 2006

Operating vehicles safely

Bosses are often quick to blame a vehicle driver for a collision, a rollover, or a spilled load. But blaming the worker just as often misses the root causes of unsafe motor vehicle use. For example, a driver may be exhausted from overwork, or he may be distracted by pain from an untreated work injury. Pressure to work faster can cause workers to overload a vehicle or drive it too fast. A badly maintained vehicle may have brakes that fail or broken lights. If a mirror is missing, a driver cannot see things in "blind spots" on either side of the vehicle.

Bosses and supervisors must be held responsible for vehicle safety in the factory.

Many injuries can be prevented by:

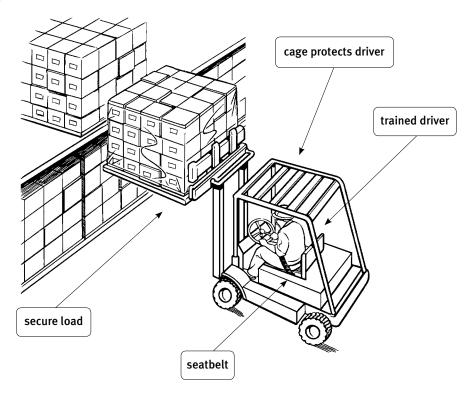
- Training drivers to operate each vehicle safely, including how to load, unload, lift and lower loads, and limit the size and weight of loads.
- Maintaining and repairing vehicles regularly, including brakes, hydraulic systems, lights, and turn signals.
- Keeping windows and mirrors clear, clean, and firmly attached.
- Limiting driving speeds, so drivers and people crossing vehicle paths have plenty of time to stop and prevent collisions.
- Turning a vehicle instead of driving in reverse. If there is not enough space to turn a vehicle around, the driver should always ask another worker to make sure the way is clear before moving in reverse.
- Enforcing vehicle rules, including speed limits, loading limits, and driving only in designated lanes.

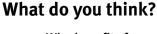


Lift truck safety

If lift trucks are not properly loaded and operated, they can roll over, or their loads can fall onto the driver or other workers. These problems can be prevented by training drivers to operate, load, and unload lift trucks safely. The driver can better avoid problems when there is enough room to move the lift truck safely and to turn around instead of backing up in reverse.

A cage or bars around the driver can help protect him from injury if the truck rolls over or the cargo falls off the lift. A secure seat belt will also prevent the driver from falling out of the vehicle at a corner, while turning in his seat, or if the truck rolls over.





Who benefits from more motor vehicles and faster traffic going to and from factories? Who is hurt by this?

How can workers organize to make walking and driving motor vehicles safer in their factory area?

Health effects of chemicals

The chart on the following pages shows the known health effects of some specific chemicals used in the kinds of factories described in this book. Exposure to these chemicals increases your risk of getting the health problems shown in the chart.

You can be exposed to a chemical by:

- breathing in chemical vapor in the air, or breathing in dust or smoke that contains chemicals.
- absorbing chemical dust, powder, grease, or liquid through your skin or eyes.
- putting food, drinks, or cigarettes in your mouth that have chemicals on them or in them, or by accidentally swallowing a liquid chemical.

For more information about how chemicals get into the body, health problems caused by chemicals, and how to prevent exposure to dangerous chemicals, see 'Chemicals' on pages xx to xx.

What the symbols mean

These problems happen more often.



harms the skin



harms the eyes, nose, or throat



feeling sick, dizzy, or drunk

These problems happen less often, but they are more serious.



harm inside the body



problems having healthy children



causes cancer

Some health effects are not known

Some chemicals may harm health in ways that are not shown in the chart. The **?** in the chart means there is not enough information about the long-term effects of a chemical to say how harmful it is. For more information about this problem, see 'Why are there poisonous chemicals in factories?' on page xx.

Chemical mixtures may be more dangerous

Scientists study each chemical alone to see how it can harm a person's health. But many chemical products —such as cleaners, dyes, paints, and glues— are a mixture of several chemicals. For example, paint contains solvents, pigments, and other materials. Solvents usually cause health problems that are different from the problems caused by pigments. There are very few studies to find out if chemical mixtures are more dangerous or have different harmful effects than each chemical by itself.



A chemical can have more than one name

We list each chemical in the chart by one name. You may know the same chemical by a different name. Sometimes the names of chemicals look very similar. The difference may be only a few letters or a number. Because of this, each chemical also has a unique number called a CAS number. The chart shows the CAS number of each chemical along with the other names of that chemical.

If the chemical name you want to look up is not in the chart, use the list of 'Other chemical names' on page xx to see if it has a different name in the chart. For example, the chemical "2-ethoxy ethanol" is sometimes called "Cellosolve®", and sometimes called "ethylene glycol monoethyl ether."

We have listed this chemical as "2-ethoxy ethanol" in chart. If you look for "Cellosolve®" in the list of 'Other chemical names,' you will find this entry:

Cellosolve®.....see 2-ethoxy ethanol

If you look for "ethylene glycol monoethyl ether" in the list of 'Other chemical names,' you will find this entry:

ethylene glycol monoethyl ether see 2-ethoxy ethanol

For more information about the health effects of chemicals, see xx in 'Resources,' on page xx.

How to find a specific chemical using the chart

To find information about a chemical, first look for the name of the chemical in the chart. If the name begins with a number, use the first letter of the name to find the chemical. For example, you will find "2-ethoxy ethanol" with the chemical names that begin with the letter 'E'. The chemical names are listed in the order of the alphabet:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

acetone

Other names: 2-propanone, dimethyl ketone **Uses:** solvent, nail polish remover



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.

CAS# 67-64-1



Harms brain.



Harms baby during pregnancy.



None.



Catches fire easily. Not as poisonous as most other solvents. Small amounts are safe to use. Smells very bad. See 'Solvents' on page xx.

acrylamide CAS# 79-06-1

Other names: acrylamide monomer

Uses: a white powder or liquid used in glues, dye, textiles, permanent press fabrics



Red, itchy, dry, or cracked skin. Skin on palms peels.



Watery, red eyes. Itchy, dry nose and throat.



None.



Serious harm to nerves in hands, arms, and legs.



?



Cancer.

Acrylamide monomer is very poisonous and easily absorbed through skin.

asbestos

CAS# 1332-21-4

Other names: none

Uses: fireproof fabrics, brake lining, gaskets, heating and electrical insulation, pipe insulation, reinforcing in rubber, plastic, and cement



None.



None.



None.



Hardening of the lungs (asbestosis).



None.



Lung cancer, cancer of the lining around the lungs (mesothelioma), and other cancers.

Very poisonous dust. See 'Asbestos' on page xx.

benzene

CAS# 71-43-2

Other names: benzol, phenyl hydride

Uses: solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain. Harms blood cells, causes weak blood (anemia).



Harms baby during pregnancy.



Cancer of the blood (leukemia) and other cancers.



Catches fire easily. More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

beryllium

CAS# 7440-41-7

Other names: Be, beryllium fluoride, beryllium chloride, beryllium sulfate, beryllium oxide, beryllium phosphate, glucinium

Uses: in some metal alloys, especially for aerospace and high-tech parts



Red, itchy rash.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Breathing problems, fatigue, fever, weight loss. Harms brain, lungs, liver, kidneys, and bones.



?



Lung cancer.

Very poisonous dust and fume. See also 'Lead and other toxic metals' on page xx.

boric acid

CAS# 10043-35-3

Other names: none

Uses: flame retardant treatment for cellulose, mattresses, and textiles glassmaking



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



None.



None.



Makes men unable to have children.



?

Easily absorbed through skin.

bromopropane

CAS# 75-26-3 and 106-94-5

Other names: 1-bromopropane, 2-bromopropane, n-propyl bromide, isopropyl bromide

Uses: solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



None.



Anemia. Harms liver. Harms nerves controlling walking, bowel, bladder, and other functions.



Makes men and women unable to have children. Affects women's monthly bleeding. Harms baby during pregnancy.



Cancer.

More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

cadmium

CAS# 7440-43-9

Other names: none

Uses: metal and compounds from metal alloys, enamels, fungicide, batteries, electronics, solder, pigment



None.



Watery, red eyes.



None.



Harms kidneys, bones, lungs, nerves, and ability to smell.



Harms ability of men to have children.



Lung, prostate, and other cancers.

Very dangerous to inhale in any form. Causes fever with breathing problems (metal fume fever). See 'Lead and other toxic metals' on page xx.

carbon monoxide

CAS# 630-08-0

Other names: CO

Uses: a gas found in motor exhaust, especially from gasoline, diesel, kerosene, and CNG motors, and in smoke and fumes from fires



None.



None.



Headache, nausea, feeling tired, unconsciousness, death.



Harms blood.



Harms baby during pregnancy.



None.

CO has no smell. A common killer from running motors or burning fires indoors. See 'Motor exhaust' on page xx.

carbon tetrachloride

CAS# 56-23-5

Other names: carbon tet, carbon chloride, tetrachloromethane, Freon® 10, Halon® 104 Uses: solvent, stain spotter



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain, liver, kidneys, and heart.



Harms baby during pregnancy.



Liver cancer.

More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

chlorine

CAS# 7782-50-5

Other names: chlorine gas

Uses: disinfection treatment of water and sewage



Burns skin.



Burns eyes, nose, and throat.



None.



Causes death. Burns lungs. Asthma.



None.



None.

Very dangerous to breathe in.

chloroform CAS# 67-66-3

Other names: methane trichloride, trichloromethane **Uses:** solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain, liver, kidneys, and heart. Can stop the heart.



Harms baby during pregnancy.



Cancer.

More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

chromium CAS# 7440-47-3

Other names: Cr, chrome, chromic acid, chromic trioxide, zinc chromate, potassium dichromate, and other chromate and dichromate compounds

Uses: paints; stainless steel welding and cutting; chromate welding and cutting; electroplating baths for chrome plating onto metal and plastic; in stainless steel, pigments, dyes and glazes, wood preservatives, leather tanning, ferrochrome metal casting, anticorrosion coatings



Red, itchy allergic rash. Skin wounds that heal slowly.



Burns to eyes, nose, and throat from chromic acid. Wound inside nose.



None.



Harms lungs causing wheezing, chest pain. Chromic acid can stain and eat away teeth.



?



Lung cancer.

"Hard chrome" plating is more poisonous than "bright chrome" plating. See 'Lead and other toxic metals' on page xx.

cobalt CAS# 7440-48-4

Other names: Co, carbides, cobalt sulfate

Uses: metal and metal alloys such as steel and "hard metal" pigments, paint, coatings



Red, itchy allergic rash on neck, ankles, and elbow crease.



Watery, red eyes. Itchy, dry nose and throat.



None.



Wheezing, cough, and feeling short of breath. Harms lungs and heart.



?



Cancer.

See 'Lead and other toxic metals' on page xx.

colophony CAS# 8050-09-7

Other names: colophany, rosin, resin

Uses: cored solder and soldering flux, heat and pressure sensitive glue, paint, varnish, ink, corrosion inhibitors, grease, waterproofing agents



Allergic rash.



Watery, red eyes. Itchy, dry nose and throat.



None.



Asthma.



?



?

People who have allergy to colophony may react to cosmetics and creams which contain colophony. See 'Welding and soldering fumes' on page xx.

cyanide CAS# 74-90-8

Other names: CN, hydrogen cyanide, hydrocyanic acid, prussic acid, potassium cyanide Uses: metal treatment, fumigation potassium cyanide used in metal plating



Red, itchy, dry, or cracked skin. Burns.



Wound inside nose.



None.



Unconsciousness after weakness, headache, confusion, nausea.



?



?

A fast-acting poison. Antidotes to poisoning exist. Easily absorbed through skin. See 'Electroplating baths' on page xx.

DMF CAS# 68-12-2

Other names: n,n-dimethylformamide

Uses: solvent, spinning acrylic fibers, adhesives, fabric dyes and pigments



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



None.



Harms liver.



?



Testicular cancer.

More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

epoxy CAS# none

Other names: epoxy resin, glycidyl ether, epoxide, amine curing agents

Uses: a 2-part liquid that turns solid commonly used as a surface coating, glue, binding agent, forms for metal casting, and rigid foam



Red, itchy, dry, or cracked skin. Allergic rash. Burns.



Watery, red eyes. Itchy, dry nose and throat.



None.



Asthma, difficulty breathing.



?



?

2-ethoxyethanol

Other names: Cellosolve®, ethylene glycol monoethyl ether, EGEE, or any of these plus the word "acetate"

Uses: solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.

CAS# 110-80-5



Harms brain, blood (bone marrow), and kidneys.



Very harmful to baby during pregnancy. Harms ability of both men and women to have children.



?

More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

ethyl acetate

Other names: none Uses: solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.

CAS# 141-78-6



Harms brain.



Harm to baby during pregnancy.



?



Catches fire easily. Less poisonous than many other solvents. See 'Solvents' on page xx.

ethyl alcohol

CAS# 64-17-5

Other names: alcohol, grain alcohol, ethanol, denatured alcohol, SD alcohol **Uses:** solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain.



?



None.



Catches fire easily. Less poisonous than most other solvents. Industrial ethyl alcohol is usually contaminated with other chemicals that make it more poisonous to drink than alcoholic beverages. See 'Solvents' on page xx.

ethylene glycol

CAS# 107-21-1

Other names: ethylene alcohol, glycol, and 1,2-ethanediol **Uses:** solvent, antifreeze, polyester manufacture



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain.



Harms baby during pregnancy.



?

See 'Solvents' on page xx.

fiberglass and mineral wools

CAS# none

Other names: glass wool, fibrous glass, slag wool, rock wool, ceramic fibers **Uses:** insulation, filters, textiles, plastic reinforcement



Itchy, red rash.



Watery, red eyes. Itchy nose and throat.



None.



Harms lungs.



None.



Lung cancer.

Less harmful than asbestos. Often used instead of asbestos.

formaldehyde

CAS# 50-00-0

Other names: formalin (liquid), HCHO, formaldehyde gas **Uses:** permanent press fabric coating, foam insulation, epoxy resins, disinfectant, plywood and particle wood products



Red, itchy, dry, or cracked skin. Burns. Allergic rash.



Watery, red eyes. Itchy, dry nose and throat.



Headache and irritability from high exposure.



Harms lungs. Asthma.





Cancer of nose, throat, and breathing passages.

Extremely strong smell. Allergic skin rash and asthma may occur at exposure so low you cannot smell it. People who have allergy to formaldehyde may react to cosmetics which contain formaldehyde. See 'Formaldehyde' on page xx.

CAS# 8006-61-9 gasoline

Other names: petrol, motor fuel, benzene

Uses: fuel, solvent



Red, itchy, dry, or cracked skin. Burns.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzv.



Stops the heart. Harms brain and kidneys.



Leaded gasoline harms ability of both men and women to have healthy children, and harms baby during pregnancy.



Cancer.



Catches fire easily. Easily absorbed through skin. Siphoning gasoline by mouth is very dangerous due to risk of swallowing gasoline. See 'Solvents' on page xx.

HCFCs and HFCs

CAS# different for each type

Other names: Freon substitutes, "ozone-safe" substitutes,

hydrochlorofluorocarbons, hydrofluorocarbons

Uses: liquids and gases used as refrigerant, solvent, propellant for aerosol spray, fire suppression systems, foam blowing agent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzv.



Harm brain. liver, and heart.



Some types harm baby during pregnancy.



HCFC-123 harms liver. HCFC-124 and HCFC-125 may harm liver. Most HCFCs and HFCs are new chemicals and their health effects are unknown. Some are easily absorbed through skin.

hexane

CAS# 100-54-3

Other names: n-hexane

Uses: solvent, propellant for aerosol spray, glues



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat. Cough.



Headache, nausea, confusion, feel weak or dizzy.



Numb or weak hands and feet. Harms nerves in hands, arms, legs, and feet.



Harms baby during pregnancy.



?



Catches fire easily. More poisonous than most other solvents. See 'Solvents' on page xx.

hydrochloric acid

CAS# 7646-01-0

Other names: HCl, muriatic acid, hydrogen chloride

Uses: cleaning



Burns.



Burns to eyes, nose, and throat. Choking feeling.



None.



Burns lungs. Wears away teeth.



None.



Lung cancer.

hydrofluoric acid

CAS# 7664-39-3

Other names: HF

Uses: etching baths, electroplating baths for metal, cleaning



Severe burns.



Severe burns to eyes, nose, and throat from liquid splash or vapor.



None.



Burns lungs. Chronic coughing. Harms bones.



?



?

Extremely dangerous to touch liquid or inhale mist. Burns are often painless at first but are still very serious and will become painful later.

hydrogen peroxide

CAS# 7722-84-1

Other names: 10% to 90% hydrogen peroxide

Uses: bleach, deodorize, disinfect fabric or other materials



Red, itchy, dry, or cracked skin. Burns skin.



Watery, red eyes. Burns eyes. Itchy, dry nose and throat.



None.



None.



?



?



Helps other materials burn faster. Burns to eyes and skin from a splash may take hours or days to become visible.

isopropyl alcohol

CAS# 67-63-0

Other names: isopropanol, propyl alcohol, IPA, 2-propanol, dimethylcarbinol **Uses:** solvent, soldering flux, disinfectant



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain. Harms kidneys if swallowed.



Harms baby during pregnancy.



?



Catches fire easily. Not as poisonous as most other solvents. See 'Solvents' on page xx.

kerosene

CAS# 8008-20-6

Other names: stove oil, kerosine

Uses: fuel, solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain.



Harms baby during pregnancy.



?



Catches fire easily. "High Flash" kerosene does not catch fire as easily as other kerosene. See 'Solvents' on page xx.

lead CAS# 7439-92-1

Other names: Pb, any solid or liquid chemical with the word "lead" or "Pb" in the name **Uses:** in solder, batteries, radiators, gasoline, metal alloys, pigments in plastics, glazes and paint



None.



None.



None.



Harms brain, nerves, kidneys, and blood (anemia).



Harms ability of both men and women to have healthy children. Harms baby during pregnancy.



Cancer.

Very poisonous dust. Lead in liquids is easily absorbed through skin. See 'Lead' on page xx.

manganese CAS# 7439-96-5

Other names: Mn, ferromanganese

Uses: metal and steel alloys, welding rods, batteries



None.



Itchy, dry nose and throat.



Headache.



Tremors, weakness, loss of balance, dementia. Harms brain, lungs, liver, and kidneys.



Affects ability of men to have children.



7

Very poisonous fume and dust. See 'Welding and soldering fumes' on page xx and 'Lead and other toxic metals' on page xx.

mercury CAS# 7439-97-6

Other names: Hg, quicksilver, any chemical with mercury or Hg in the name **Uses:** metal and compounds, electrical parts, mirror coatings



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



None.



Tremors. Dementia. Harms kidneys, brain, and nerves.



Harms baby during pregnancy. Passed to baby through mothers' milk if mother works with mercury. Affects a woman's monthly bleeding. Affects ability of men to have children.



?

Very poisonous. Liquid mercury at room temperature gives off vapors with no smell. See 'Lead and other toxic metals' on page xx.

metalworking fluids

CAS# none

Other names: many types of metalworking fluids with different names **Uses:** cools and lubricates metals during machining



Red, itchy, dry, or cracked skin. Pimples. Allergic rash.



Watery red eyes. Itchy nose and throat. Coughing, sneezing.



None.



Harms lungs.



?



Cancer of skin, lung, stomach, intestines.

May contain 2-ethoxyethanol, 2-methoxyethanol, or pentachlorophenol, which harm baby during pregnancy. See '2-ethoxyethanol' and '2-methoxyethanol' in this chart on page xx. See 'Metalworking fluids and machine lubricants' on page xx.

2-methoxyethanol

CAS# 109-86-4

Other names: methyl Cellosolve®, ethylene glycol monomethyl ether, EGME, or any of these plus the word "acetate"

Uses: solvent



Red, itchy, dry, or cracked skin.



Watery red eyes. Itchy nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain and blood cells (bone marrow).



Harms baby during pregnancy. Harms ability of both women and men to have children.



?

More toxic than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

methyl alcohol

CAS# 67-56-1

Other names: methanol, wood alcohol, fuel alcohol Uses: solvent, lamp fuel



Red, itchy, dry, or cracked skin.



Watery red eyes. Itchy nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain. Drinking methanol causes blindness.



Harms baby during pregnancy.



?



Catches fire easily. See 'Solvents' on page xx.

methylene chloride

CAS# 75-09-2

Other names: dichloromethane, methylene dichloride **Uses:** solvent, paint remover



Red, itchy, dry, or cracked skin.



Watery red eyes. Itchy nose and throat.



Headache, nausea, feeling tired, unconsciousness, death.



Harms blood and heart. May stop heart.



Harms baby during pregnancy.



Cancer.

More poisonous than most other solvents. Easily absorbed through skin. See 'Solvents' on page xx.

methyl ethyl ketone

CAS# 78-93-3

Other names: ethyl methyl ketone, 2-butanone, MEK Uses: solvent



Red, itchy, dry, or cracked skin.



Watery red eyes. Itchy nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Numbness in fingers, arms, legs. Harms brain.



Harms baby during pregnancy.



?



Catches fire easily. See 'Solvents' on page xx.

methyl isobutyl ketone

CAS# 108-10-1

Other names: hexone, 4-methyl-2-pentanone, isopropylacetone, MIBK Uses: solvent



Red, itchy, dry, or cracked skin.



Watery red eyes. Itchy nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain and kidneys.



Harms baby during pregnancy.



?



Catches fire easily. See 'Solvents' on page xx.

motor exhaust

CAS# none

Other names: exhaust, engine fumes, motor vehicle exhaust, tailpipe emissions **Uses:** fumes from burning fuel, including diesel, gasoline, kerosene, propane, and CNG



None.



Watery red eyes. Itchy nose and throat.



Headache, nausea, feeling tired, unconsciousness, death.



Harms blood. Diesel exhaust causes asthma, bronchitis.



Harms baby during pregnancy.



Gasoline motor exhaust causes cancer.
Diesel exhaust causes lung cancer.

All motor exhaust contains carbon monoxide. See 'carbon monoxide' in this chart on page xx. Exhaust from motors using leaded gasoline also contains lead. See 'lead' in this chart on page xx and 'Motor exhaust' on page xx.

naphtha

CAS# 8030-30-6

Other names: petroleum naphtha, petroleum ether, petroleum distillates, mineral spirits, kerosene, paint thinner, VM&P naptha, white spirits, benzin, ligroin

Uses: solvent



Red, itchy, dry, or cracked skin.



Watery red eyes. Itchy nose and throat. Coughing.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain.



Harms baby during pregnancy.



?



Some catch fire easily. "High Flash" catch fire less easily. Most naphthas are less poisonous than most other solvents. "Coal tar" naphtha is more poisonous than other naphthas. See 'Solvents' on page xx.

nickel

CAS# 7440-02-0

Other names: Ni

Uses: in metal alloys (stainless steel, copper, brass), electroplating baths for coating metal, batteries



Red, itchy, dry, or cracked skin. Allergic rash.



Stuffy, runny nose. Harms sense of smell. Wound inside nose.



None.



Harms lungs. Asthma.



?



Cancer of lungs and nasal passages.

Skin allergy to nickel is common. People who have an allergy to nickel may react to metal tools, coins, jewelry, pigments, or other things which contain nickel. See 'Lead and other toxic metals' on page xx.

nitric acid CAS# 7697-37-2

Other names: engravers acid, azotic acid

Uses: engraving, etching steel, urethane coatings, plastic, rubber



Mist causes red, itchy, dry, or cracked skin. Burns skin.



Mist causes red, watery eyes. Itchy nose and throat. Liquid burns eyes.



None.



Harms lungs. Burns to lungs may not be felt until hours after exposure. Wears away teeth.



None.



?

NMP CAS# 872-50-4

Other names: n-methyl-2-pyrrolidone, m-pyrol **Uses:** solvent, waterproof coating for fabric, paint remover



Red, itchy, dry, or cracked skin.



Watery, red, painful eyes.



Headache.



?



Harms baby during pregnancy.



?

CAS# 7664-38-2

Easily absorbed through skin. See 'Solvents' on page xx.

phosphoric acid

Other names: orthophosphoric acid

Uses: treating metal, electroplating baths for metals, dying cotton, food processing



Burns skin.



Watery, red eyes. Burns eyes. Itchy, dry nose and throat. Coughing.



None.



None.



None.



?

Not as poisonous as most other acids.

phthalates

CAS # different for each type

Other names: DEHP (di-ethylhexyl phthalate), DOP di-octyl phthalate),

DBP (di (n-butyl) phthalate), DEP (diethyl phthalate), DBP (dibutyl phthalate)

Uses: softener for making PVC and other plastics



None.



None.



None.



None.



?



7

Easily absorbed through skin.

polyurethane

CAS # 9009-54-5

Other names: polyurethane plastic, urethane, isocyanate, PUR plastic,

HDI (hexamethylene diisocyanate), HMDI (methylene bis-cyclohexylisocyanate),

IPDI (isophorone diisocyanate), MDI (methylene bis-phenylisocyanate), NDI (naphthalene diisocyanate), TDI (toluene diisocyanate)

Uses: hard and soft plastic parts, textiles, rubber, foam, paint, coatings, sealants



Red, itchy, dry or cracked skin. Allergic rash.



Watery, red eyes. Itchy, dry nose and throat. Burns eyes.



None.



Wheezing, shortness of breath, asthma. Harms lungs.



?



TDI causes cancer. Harm from other types unknown.

Uncured liquid or sprayed polyurethane causes harm. Cured plastic is safe. Fume from melted or burned polyurethane is poisonous. See 'Plastic fumes' on page xx.

PVC CAS # 9002-86-2

Other names: polyvinyl chloride, vinyl chloride plastic

Uses: hard and soft plastic parts and containers, textiles, rubber, foam, glue, sealants, coatings



None.



None.



None.



None.



None.



None.

Soft PVC may contain phthalates. See 'phthalates' in this chart on page xx. Fumes from burned PVC are poisonous. See 'Plastic fumes' on page xx.

silica CAS # none

Other names: sand

Uses: metalcasting, glassmaking, sandblasting, abrasive papers, grinding wheels



None.



Red, watery eyes. Itchy, dry nose and throat.



None.



Hardening of the lungs (silicosis).



None.



Lung cancer.

Breathing silica dust increases risk of becoming ill with TB and makes TB worse in workers already ill. See 'Silica' on page xx and 'TB' on page xx.

sodium hydroxide

CAS # none

Other names: lye, caustic soda, sodium hydrate, white caustic **Uses:** textile and garment processing, etching, electroplating



Burns skin.



Burns eyes.



None.



None.



None.



?

sodium hypochlorite

CAS # 7681-52-9

Other names: bleach, chlorine bleach, Clorox™

Uses: bleaching textiles and garments, water purification, disinfectant



Red, itchy, dry, or cracked skin. Burns skin.



Watery, red eyes. Burns eyes. Itchy, dry nose and throat.



None.



None.



None.



?

Never mix with other chemicals. Mixing bleach with ammonia or an acid creates poisonous chlorine gas.

styrene

CAS # 100-42-5

Other names: styrene monomer, polystyrene, vinyl benzene, phenylethylene, Styrofoam™, Styron™

Uses: a solid, strong plastic in many forms, such as rigid foam and hard plastic parts, casings, fiberglass lay-up, containers, packaging, insulation



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



None.



Loss of hearing and ability to see colors. Harms liver, kidneys, heart, and nerves.



Harms baby during pregnancy.



Leukemia. Cancer of lymph nodes and blood (bone marrow).



Catches fire easily. Liquid styrene is easily absorbed through skin. Fumes from burning polystyrene are poisonous. See 'Plastic fumes' on page xx.

sulfuric acid

CAS # 7664-93-9

Other names: hydrogen sulfate, battery acid **Uses:** in dye, pigment, etching, electroplating baths



Burns skin.



Burn eyes, nose, and throat.



None.



Burns lungs, causing death.



None.



Mist causes cancer of lungs, sinus, throat.

CAS # 127-18-4

tetrachloroethylene

Other names: perchloroethylene, perc Uses: solvent, dry cleaning of fabric



Red, itchy, dry or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Numbness and weakness in hands and feet. Harms brain and liver.



Harms baby during pregnancy.



Throat cancer. Lymphoma.

More poisonous than most other solvents. See 'Solvents' on page xx.

toluene CAS # 108-88-3

Other names: methylbenzene, phenylmethane **Uses:** solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms kidneys and liver. Harms nerves in arm and legs. Harms hearing.



Harms baby during pregnancy.



?



Catches fire easily. Easily absorbed through skin. See 'Solvents' on page xx. Workers can become addicted to sniffing toluene. Sniffing may cause sudden death.

trichloroethane

CAS # 71-55-6 (1,1,1-TCA) and 79-00-5 (1,1,2-TCA)

Other names: 1,1,1-trichloroethane,

methyl chloroform, 1,1,2-trichloroethane, vinyl trichloride, beta-trichloroethane, TCA

Uses: solvent, dry cleaning of fabric



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry, nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain. Stops heart.



Harms baby during pregnancy.



?

See 'Solvents' on page xx.

trichloroethylene

Other names: TCE

Uses: solvent, dry cleaning of fabric



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.

CAS # 79-01-6



Harms brain, liver, and kidneys. Harms facial nerves, taste, and smell. Stops heart.



Harms baby during pregnancy. Harms ability of men to have children.



Liver cancer. Lymphoma.

Drinking alcoholic beverages after working with TCE can immediately give you a headache or make you feel nauseous, dizzy, weak, or confused. See 'Solvents' on page xx.

tricresyl phosphate

CAS # 1330-78-5

Other names: TCP, TOCP, tri-o-cresyl phosphate

Uses: in clear coatings and lubricating oils, softener for PVC



None.



None.



None.



Harms nerves, especially in legs. Stomach ache.



?



?

More poisonous than most other solvents. Easily absorbed through skin.

turpentine

CAS # 8006-64-2

Other names: gum turpentine, wood turpentine, spirit of turpentine **Uses:** solvent, paint thinner



Red, itchy, dry, or cracked skin. Allergic rash.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain and kidneys.



?



?

Easily absorbed through skin. See 'Solvents' on page xx.

xylene

CAS # 1330-20-7

Other names: dimethylbenzene, xylol

Uses: solvent



Red, itchy, dry, or cracked skin.



Watery, red eyes. Itchy, dry nose and throat.



Headache, nausea, confusion, feel weak or dizzy.



Harms brain, liver, and kidneys.



Harms baby during pregnancy.



?



Catches fire easily. Easily absorbed through skin. See 'Solvents' on page xx.

zinc CAS # 7440-66-6

Other names: galvanized coating, zinc oxide, zinc chloride

Uses: in brass, bronze, and die-casting alloys electroplating and metal treating baths, batteries, pigment in paints and dyes



Zinc chloride burns skin and causes allergic rash.



Zinc chloride burns eyes and lungs.



None.



Harms the lungs. Asthma.



?



?

Welding metal containing zinc (galvanized steel) can cause metal fume fever. See 'Lead and other toxic metals' on page xx.

Other chemical names

Some of the names on this list are chemical compounds. For example, beryllium chloride and beryllium sulfate are compounds containing beryllium mixed with another chemical. Each chemical compound has its own CAS number that is different from the CAS number of the chemical listed in the chart on pages xx to xx. But the health effects of these compounds are the same as the health effects of the chemical listed in the chart. For ways to get more information about chemicals and their CAS numbers, see 'Resources' on pages xx to xx.

Co...see cobalt acrylamide monomer . . . see acrylamide alcohol . . . see ethyl alcohol cobalt sulfate . . . see cobalt amine curing agents . . . see epoxy colophany ... see colophony azotic acid . . . see nitric acid Cr...see chromium battery acid . . . see sulfuric acid DBP (dibutyl phthalate) . . . see phthalates Be ... see beryllium DBP (di-n-butyl phthalate) . . . see phthalates benzene ... see gasoline DEHP (di-ethylhexyl phthalate) . . . see phthalates denatured alcohol ... see ethyl alcohol benzin ... see naphtha benzol...see benzene DEP (diethyl phthalate) . . . see phthalates beryllium chloride . . . see beryllium dichloromethane . . . see methylene chloride beryllium fluoride . . . see beryllium dimethylbenzene . . . see xylene beryllium oxide . . . see beryllium dimethylcarbinol . . . see isopropyl alcohol beryllium phosphate . . . see beryllium dimethyl ketone . . . see acetone beryllium sulfate . . . see beryllium DOP (di-octyl phthalate) . . . see phthalates beta-trichloroethane . . . see trichloroethane bleach . . . see sodium hypochlorite EGEE . . . see 2-ethoxyethanol 1-bromopropane . . . see bromopropane EGEE acetate . . . see 2-ethoxyethanol 2-bromopropane . . . see bromopropane EGME . . . see 2-methoxyethanol EGME acetate . . . see 2-methoxyethanol 2-butanone . . . see methyl ethyl ketone engine fumes ... see motor exhaust carbides . . . see cobalt engravers acid . . . see nitric acid carbon chloride ... see carbon tetrachloride epoxide . . . see epoxy carbon tet . . . see carbon tetrachloride epoxy resin . . . see epoxy caustic soda . . . see sodium hydroxide 1,2-ethanediol . . . see ethylene glycol Cellosolve[®] . . . see 2-ethoxyethanol ethanol . . . see ethyl alcohol Cellosolve® acetate . . . see 2-ethoxyethanol ethylene alcohol . . . see ethylene glycol ceramic fibers . . . ethylene glycol monoethyl ether . . . see fiberglass and mineral wools see 2-ethoxyethanol chlorine bleach . . . see sodium hypochlorite ethylene glycol monoethyl ether acetate . . . see 2-ethoxyethanol chlorine gas ... see chlorine ethylene glycol monomethyl ether . . . chrome ... see chromium see 2-methoxyethanol chromic acid ... see chromium ethylene glycol monomethyl ether acetate . . . chromic trioxide . . . see chromium see 2-methoxyethanol Clorox[™] . . . see sodium hypochlorite ethyl methyl ketone . . . see methyl ethyl ketone CN . . . see cyanide

exhaust ... see motor exhaust

CO... see carbon monoxide

methane trichloride . . . see chloroform methanol . . . see methyl alcohol ferromanganese ... see manganese methylbenzene . . . see toluene fibrous glass . . . see fiberglass and mineral wools methyl Cellosolve® . . . see 2-methoxyethanol formaldehyde gas . . . see formaldehyde formalin . . . see formaldehyde methyl Cellosolve® acetate . . . see 2-methoxyethanol Freon®10...see carbon tetrachloride methyl chloroform . . . see trichloroethane Freon substitutes . . . see HCFCs and HFCs methylene dichloride . . . see methylene chloride fuel alcohol ... see methyl alcohol 4-methyl-2-pentanone . . . see methyl isobutyl ketone galvanized coating . . . see zinc MIBK... see methyl isobutyl ketone glass wool . . . see fiberglass and mineral wools mineral spirits . . . see naphtha glucinium . . . see beryllium Mn...see manganese glycidyl ether . . . see epoxy motor fuel . . . see gasoline glycol . . . see ethylene glycol motor vehicle exhaust . . . see motor exhaust grain alcohol . . . see ethyl alcohol m-pyrol...see NMP gum turpentine . . . see turpentine muriatic acid . . . see hydrochloric acid Halon®104...see carbon tetrachloride NDI (naphthalene diisocyanate) ... HCHO...see formaldehyde see polyurethane HCl...see hydrochloric acid n-hexane ... see hexane HDI (hexamethylene diisocyanate) . . . see Ni . . . see nickel polyurethane n-methyl-2-pyrrolidone . . . see NMP hexone . . . see methyl isobutyl ketone n,n-dimethylformamide . . . see DMF HF...see hydrofluoric acid n-propyl bromide . . . see bromopropane Hg...see mercury HMDI (methylene bis-cyclohexylisocyanate) . . . see orthophosphoric acid . . . see phosphoric acid polyurethane "ozone-safe" substitutes . . . see HCFCs and HFCs hydrochlorofluorocarbons . . . see HCFCs and HFCs hydrocyanic acid . . . see cyanide paint thinner . . . see naphtha hydrofluorocarbons . . . see HCFCs and HFCs Pb... see lead hydrogen chloride ... see hydrochloric acid perc... see tetrachloroethylene hydrogen cyanide . . . see cyanide perchloroethylene . . . see tetrachloroethylene hydrogen sulfate . . . see sulfuric acid petrol ... see gasoline petroleum distillates . . . see naphtha IPA . . . see isopropyl alcohol petroleum ether . . . see naphtha IPDI (isophorone diisocyanate) . . . see polyurethane petroleum naphtha . . . see naphtha isocyanate . . . see polyurethane phenylethylene ... see styrene isopropanol . . . see isopropyl alcohol phenyl hydride . . . see benzene isopropylacetone . . . see methyl isobutyl ketone phenylmethane ... see toluene isopropyl bromide . . . see bromopropane polystyrene . . . see styrene polyurethane plastic . . . see polyurethane kerosene . . . see naphtha polyvinyl chloride . . . see PVC kerosine . . . see kerosene potassium cyanide . . . see cyanide potassium dichromate . . . see chromium ligroin ... see naphtha 2-propanol ... see isopropyl alcohol lye . . . see sodium hydroxide 2-propanone ... see acetone propyl alcohol ... see isopropyl alcohol MDI (methylene bis-phenylisocyanate) . . . see polyurethane prussic acid . . . see cyanide

PUR plastic . . . see polyurethane

MEK...see methyl ethyl ketone

quicksilver ... see mercury

resin... see colophony rock wool... see fiberglass and mineral wools rosin... see colophony

sand ... see silica
SD alcohol ... see ethyl alcohol
slag wool ... see fiberglass and mineral wools
sodium hydrate ... see sodium hydroxide
spirit of turpentine ... see turpentine
stove oil ... see kerosene
styrene monomer ... see styrene
StyrofoamTM ... see styrene
StyronTM ... see styrene

tailpipe emissions . . . see motor exhaust

TCA... see trichloroethane
TCE... see trichloroethylene
TCP... see tricresyl phosphate
TDI (toluene diisocyanate)... see polyurethane
tetrachloromethane... see carbon tetrachloride
TOCP... see tricresyl phosphate
1,1,1-trichloroethane... see trichloroethane
1,1,2-trichloroethane... see trichloroethane
trichloromethane... see chloroform
tri-o-cresyl phosphate... see tricresyl phosphate

urethane ... see polyurethane vinyl benzene ... see styrene vinyl chloride plastic ... see PVC vinyl trichloride ... see trichloroethane VM&P naptha ... see naphtha

white caustic... sodium hydroxide white spirits... see naphtha wood alcohol... see methyl alcohol wood turpentine... see turpentine

xylol . . . see xylene

zinc chloride ... see zinc zinc chromate ... see chromium zinc oxide ... see zinc



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