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Tool Kit Item #2

THE “TOXIC TWENTY-FIVE” PRIORITY SUBSTANCES



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What are the 25 toxic substances that must be reported?

Under the new Environmental Reporting and Disclosure Bylaw, companies must report their use and release of 25 different hazardous pollutants or groups of pollutants.

The City chose these substances because they pose a significant risk to our health if we breathe them every day over a long period of time. We know the risks associated with these substances, first, because studies show workers who have been exposed to them over a number of years have developed specific health problems, and, second, because hospital admissions for breathing problems increase when air pollution levels are high.

Some of the “toxic 25” pollutants – formaldehyde and benzene, for example – are known to cause cancer, while many others are likely to cause cancer or may possibly cause cancer. A few of them are not associated with cancer at all, but can irritate the lungs and make breathing problems like asthma or emphysema worse.

Very little is known about the levels of these substances in the City’s air. However, in 2002 Toronto Public Health found that at least 7 of the 25 substances were in the air at levels that either approached or exceeded a “tolerable” level – that is, the level associated with more than one in a million people developing cancer.

There is also very little known about where these substances originate. The Environmental Reporting and Disclosure Bylaw will finally help us identify some of the industrial sources. However, these air pollutants come not only from industrial sources. They can also come from products we use in our homes like room sprays and cleaning products, or from the exhaust of cars and lawnmowers. See [Tool Kit Item #8](#) for more information on how to reduce pollutants in your own home.

What are the Effects of these Chemicals?

The 25 priority substances are listed in alphabetical order in the chart below. The list explains the health effects, the way in which these substances are used, which industries are most likely to be using them, and the workers who might be exposed. Because some of these chemicals are more toxic than others, Toronto Public Health has developed Toxic Equivalency Potential (TEP) ratings for each substance.

According to the Phase 1 ChemTRAC report written by Toronto Public Health, “toxic equivalency potential (TEP) provides a value based on the amount released and the toxicity of a substance. A high TEP value represents a higher potential to cause harm” (pp. 14). These values are given and explained in the ChemTRAC Annual Report 2010 (pages 14-16) at www.toronto.ca/health/chemtrac/pdf/final_report_2012.pdf. However, even though some substances may be more harmful than others, the more effort we put into pollution prevention and toxics reduction, the less these substances will cause harm.




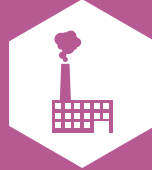



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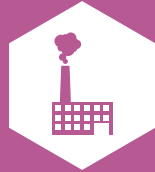




WHAT ARE THE EFFECTS OF THESE CHEMICALS?

LEGEND:




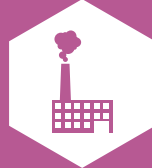




SUBSTANCES THAT CAN BE FOUND IN THE HOME




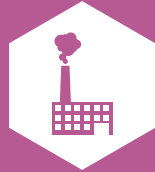









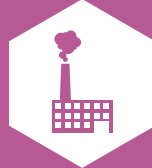



				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
ACETALDEHYDE	<ul style="list-style-type: none"> possibly causes cancer when inhaled can also irritate the eyes and the lungs 	<ul style="list-style-type: none"> as an intermediate in chemical manufacturing in the production of pesticides, dyes, synthetic rubber, disinfectants, lacquers and varnishes, photographic chemicals and room air deodorizers as a flavouring agent in foods such as soft drinks, baked goods and milk products 	<ul style="list-style-type: none"> plastic and rubber products manufacturing industries chemical manufacturing vener plywood and engineered wood products manufacturing food and beverage manufacturing 	<ul style="list-style-type: none"> plastic machine operators, workers in rubber and plastic products manufacturing, plastic products assemblers, finishers, and inspectors, workers in food, beverage and tobacco processing 
ACROLEIN	<ul style="list-style-type: none"> irritates the lungs causing coughing and shortness of breath causes congestion and irritation of the eyes, nose and throat 	<ul style="list-style-type: none"> as an intermediate in the manufacture of acrylic acid in the formulation of pesticides, leather tanning, drugs, and photography other sources include vehicle exhaust, tobacco smoke, wood burning and fossil fuel combustion 	<ul style="list-style-type: none"> manufacturing industries, including drug and pesticide manufacturing 	<ul style="list-style-type: none"> workers in drug and pesticide manufacturing facilities
BENZENE	<ul style="list-style-type: none"> causes cancer 	<ul style="list-style-type: none"> in the production of ethylbenzene, which is used to produce styrene as a chemical intermediate in the manufacture of detergents, explosives, drugs and dyes as a solvent for fats, waxes, resins, oils, inks, paints, plastics and rubber in the extraction of oils from seeds and nuts in printing and lithography other sources include crude oil and gasoline 	<ul style="list-style-type: none"> petrochemical manufacturers rubber tire manufacturers auto repair; taxi and limousine services, motor vehicle dealers, and gasoline stations foundries printing companies food processing companies 	<ul style="list-style-type: none"> mechanics, gas station attendants, petroleum and chemical process workers, foundry workers, workers at rubber tire manufacturing facilities, steel workers, and printers 
1,3-BUTADIENE	<ul style="list-style-type: none"> causes cancer 	<ul style="list-style-type: none"> in the manufacture of synthetic elastomers used to make tires, vehicle parts, sealants, carpet backing, underlay, plastic bottles and food wrap, hoses, belting and moulded goods other sources are as a byproduct of wastewater and combustion 	<ul style="list-style-type: none"> manufacturers of rubber products, basic chemicals, plastic, resin, synthetic rubber and synthetic fibres, and motor vehicle products 	<ul style="list-style-type: none"> rubber processing machine operators, plastic processing machine operators




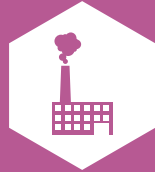


				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
<p>CADMIUM (AND ITS COMPOUNDS)</p>	<ul style="list-style-type: none"> causes cancer damages the lungs and kidneys 	<ul style="list-style-type: none"> primarily in the production of rechargeable batteries in pigments for plastics, ceramics, glasses, enamels and artists' colours as coatings for electronics, steel and aluminum, alloys and stabilizers 	<ul style="list-style-type: none"> battery manufacturers manufacturers of plastic products, motor vehicle parts, commercial and industrial machinery, architectural and structural metals, metalworking machinery and other electrical equipment foundries smelting or electroplating facilities 	<ul style="list-style-type: none"> welders cutting, brazing, soldering or welding surfaces that are cadmium coated or plated, textile printers and dyers 
<p>CARBON TETRACHLORIDE</p>	<ul style="list-style-type: none"> possibly causes cancer 	<ul style="list-style-type: none"> in chemical manufacturing and research laboratories as an intermediate in the manufacturing of refrigerants occasionally as a solvent and metal degreasing agent 	<ul style="list-style-type: none"> metal and plastic manufacturing 	<ul style="list-style-type: none"> workers in chemical plants, metal finishing, foundries and in iron and steel manufacturing 
<p>CHLOROFORM</p>	<ul style="list-style-type: none"> possibly causes cancer 	<ul style="list-style-type: none"> in the production of a refrigerant (HCFC-22) for air conditioners in the purification of some antibiotics, alkaloids, vitamins and flavours as a solvent for lacquers, floor polishes and adhesives other sources are as a byproduct of the chlorination of drinking water, swimming pools, hot tubs and municipal sewage 	<ul style="list-style-type: none"> drug manufacturing recreation industries building services water and sewage treatment plants 	<ul style="list-style-type: none"> sports and fitness instructors and lifeguards, specialized cleaners, chemical technologists and technicians, water and sewage treatment plant operators 
<p>CHROMIUM NON-HEXAVALENT Chromium is used in many forms including its most toxic, hexavalent chromium, estimated at 10% of total chromium in outdoor air – see next substance</p>	<ul style="list-style-type: none"> causes bronchitis and sinusitis damages lung tissue 	<ul style="list-style-type: none"> in making steel and other alloys in leather tanning, textile production, photography, engraving and lithography, stained glass working as a pigment in paints, inks and plastics as an anti-corrosion agent in protective coatings and in chrome plating in wood preserving in toner for copying 	<ul style="list-style-type: none"> cement plants electroplating companies leather tanneries textile producers stainless steel producers welding companies and chromate producers 	<ul style="list-style-type: none"> painters, copy machine maintenance workers, battery makers, candle makers, dye makers, printers, rubber makers, and cement workers

				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
CHROMIUM HEXAVALENT	<ul style="list-style-type: none"> causes lung cancer 	<ul style="list-style-type: none"> in making steel and other alloys in refractories and foundry sands pigments in paints in wood preservation 	<ul style="list-style-type: none"> wood preservation plants printing and support activities architectural metal manufacturing auto repair steel product manufacturing coating, engraving and heat treating companies 	<ul style="list-style-type: none"> printers and support workers stainless steel welders, machinists and pipefitters
1,4-DICHLOROBENZENE (PDCB)	<ul style="list-style-type: none"> possibly causes cancer causes irritation of the eyes, skin and nose causes headaches, coughing, skin irritation and liver damage 	<ul style="list-style-type: none"> as an intermediate in pigment and dye production as an ingredient in the manufacturing of certain pharmaceuticals and resin-bonded adhesives as a pesticide in mothballs, deodorizers and animal repellants 	<ul style="list-style-type: none"> mothball and resin-bonded abrasive wheel manufacturers chemical and pharmaceutical manufacturers 	<ul style="list-style-type: none"> workers in plants where 1,4-dichlorobenzene is manufactured or used <p>Note: high levels have been found in indoor air where household products containing PDCB such as mothballs are used</p>
1,2-DICHLOROETHANE (ETHYLENE DICHLORIDE)	<ul style="list-style-type: none"> possibly causes cancer 	<ul style="list-style-type: none"> in the production of vinyl chloride as a solvent for processing pharmaceuticals 	<ul style="list-style-type: none"> chemical and pharmaceutical manufacturers soap, cleaning compound and toilet preparation manufacturers waste treatment systems 	<ul style="list-style-type: none"> chemical plant machine operators, chemical process operators, workers in chemical products processing and utilities 
DICHLOROMETHANE (METHYLENE CHLORIDE)	<ul style="list-style-type: none"> possibly causes cancer causes respiratory effects and skin irritation 	<ul style="list-style-type: none"> as a solvent in paint strippers and varnish removers as a process solvent in the manufacture of drugs of therapeutic value and film coatings used for metal degreasing in electronics and adhesives manufacturing, and plastics processing in aerosol propellants as a urethane foam blowing agent in the food industry as an extraction medium for spices, caffeine and hops 	<ul style="list-style-type: none"> commercial paint stripping operations, such as furniture restoration, and body shops air craft paint stripping, polyurethane foam blowing, manufacturing of pharmaceuticals and chemical intermediates and tablet coating industrial cleaning and adhesives formulation 	<ul style="list-style-type: none"> workers involved in paint removal such as workers in auto body shops, furniture refinishers, painters and decorators, and building finishing contractors 

				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
ETHYLENE DIBROMIDE (DIBROMOETHANE)	<ul style="list-style-type: none"> probably causes cancer 	<ul style="list-style-type: none"> as an intermediate for dyes, resins, waxes and gum as a fumigant 	<ul style="list-style-type: none"> pesticide manufacturing pest control operations petroleum refineries waterproofing operations 	<ul style="list-style-type: none"> agricultural workers workers in chemical and pesticide manufacturing tree farm and greenhouse workers
FORMALDEHYDE	<ul style="list-style-type: none"> causes cancer 	<ul style="list-style-type: none"> in the production of glues and adhesives in pressed wood products such as particle board and plywood as a disinfectant and preservative in hospital wards, pathology labs and funeral homes as an antibacterial agent in anti-septics, medicines, fabric softeners, soaps and other personal care products in plastics and coatings, in textile finishing, such as permanent press coatings on fabrics in the manufacturing of industrial chemicals, pesticides, fertilizers, latex rubber, photographic film and preservatives as an industrial fungicide, germicide and disinfectant 	<ul style="list-style-type: none"> wood product manufacturers furniture and cabinet making companies; construction hospitals, laboratories and crematoriums foundries professional scientific services chemical manufacturers 	<ul style="list-style-type: none"> product assemblers and inspectors in wood product manufacturing, including furniture and cabinet making, foundry workers, workers in the textile industry, embalmers, pathology lab workers, health care professionals such as veterinary technicians and assistants 
LEAD (AND ITS COMPOUNDS)	<ul style="list-style-type: none"> probably causes cancer affects the nervous and reproductive systems can cause developmental and learning problems in children 	<ul style="list-style-type: none"> in the manufacture of lead acid storage batteries in pigments, coatings, ammunition, solder, casting metals and alloys in television and computer screens in ceramic glazes and crystal glassware 	<ul style="list-style-type: none"> mining, smelting and refining industries; battery production and recycling steel welding or cutting operations printing industries rubber products and plastics manufacturers auto and radiator repair shops 	<ul style="list-style-type: none"> workers in mining, lead smelting and refining industries, battery production and recycling, rubber products and plastics industries, and auto and radiator repair shops, printers, welders, ironworkers, machinists, plumbers and electronics assemblers 
MANGANESE (AND ITS COMPOUNDS)	<ul style="list-style-type: none"> affects the nervous system impairs motor skills and can make fast movements and balance more difficult 	<ul style="list-style-type: none"> in the production of steel and aluminum alloys used in beverage cans in batteries, matches, fireworks as pigments and colouring in ceramics and glass 	<ul style="list-style-type: none"> steel and aluminum alloy manufacturers battery manufacturers 	<ul style="list-style-type: none"> workers in the production or processing of steel and alloys, in battery manufacturing 

				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
MERCURY (AND ITS COMPOUNDS)	<ul style="list-style-type: none"> irritates the nose, throat and lungs adversely affects the nervous system may cause reproductive problems 	<ul style="list-style-type: none"> in the production of thermometers, barometers, batteries, dental fillings, fluorescent lights and lubrication oils in the manufacture of electrical equipment, wire and switching devices another source is its release from fossil-fuel burning power plants 	<ul style="list-style-type: none"> electricity generating power plants manufacturers of electrical equipment, batteries, fluorescent lights 	<ul style="list-style-type: none"> workers in power plants and in electrical equipment, battery and fluorescent light manufacturing facilities 
NICKEL (AND ITS COMPOUNDS)	<ul style="list-style-type: none"> causes cancer 	<ul style="list-style-type: none"> in electroplating in production of rechargeable batteries, industrial plumbing, machinery parts, resistance wiring and chemical catalysts 	<ul style="list-style-type: none"> machinery and equipment repair and maintenance facilities architectural and structural metals manufacturers machine shops engravers 	<ul style="list-style-type: none"> welders, construction millwrights, industrial mechanics, boilermakers, workers involved in plating, metal spraying, machinists and machining and tooling inspectors 
NITROGEN OXIDES	<ul style="list-style-type: none"> affects the respiratory system high levels in urban air are associated with higher hospital emissions and increased deaths from respiratory disease 	<ul style="list-style-type: none"> released as a byproduct from motor vehicle exhaust or the burning of coal, oil and natural gas, especially from power plants released during industrial processes such as welding, electroplating, engraving, and dynamite blasting 	<ul style="list-style-type: none"> welding facilities electroplaters and engravers industries that use boilers or furnaces that burn fossil fuels 	<ul style="list-style-type: none"> workers in facilities that produce nitric acid, explosives such as dynamite and TNT, or welded metals
PARTICULATE MATTER 2.5	<ul style="list-style-type: none"> irritates the eyes, throat and lungs aggravates asthma, bronchitis and other lung diseases 	<ul style="list-style-type: none"> formed from combustion sources including industrial processes, gasoline and diesel engine exhaust, fireplaces, and furnaces 	<ul style="list-style-type: none"> facilities where diesel engine exhaust is present; industries that emit particulate matter sources also include high traffic areas 	<ul style="list-style-type: none"> workers in facilities where vehicles use diesel fuel, such as underground mining 

				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
<p>POLYCYCLIC AROMATIC HYDROCARBONS A group of over 100 chemicals formed by burning coal, oil, gas, wood, garbage and other organic substances such as charbroiled meat</p>	<ul style="list-style-type: none"> • some chemicals in this group, such as benzopyrene, probably cause cancer, and some do not • affects lung function • causes skin inflammation 	<ul style="list-style-type: none"> • industrially or in research in small amounts • may be present in asphalt, coal, tar and other bituminous products 	<ul style="list-style-type: none"> • facilities where petroleum or gasoline are burned, such as gas stations and restaurants • roofing or working with coal tar products, sound- and water-proofing, coating pipes, steelmaking, and paving with asphalt 	<ul style="list-style-type: none"> • gas station attendants, firefighters, chefs and cooks and other food establishment workers 
<p>TETRACHLOROETHYLENE (PERCHLOROETHYLENE)</p>	<ul style="list-style-type: none"> • probably causes cancer • may cause nervous system depression and reproductive problems 	<ul style="list-style-type: none"> • as a solvent in dry cleaning and as a sizing and desizing agent in textile processing • as a chemical intermediate in the manufacture of chlorofluorocarbons and rubber coating • in metal degreasing operations • as an ingredient in aerosol products, solvent soaps, printing inks, adhesives, sealants, paint removers, paper coatings, leather treatments, automotive cleaners, polishes, lubricants and silicones, wood cleaners, shoe polish and spot removers 	<ul style="list-style-type: none"> • printing companies • dry cleaners and laundry services, • textile product, textile furnishing and fabric mills • engravers • manufacturers of chemical and consumer products 	<ul style="list-style-type: none"> • workers in metal degreasing, textile processing, dry cleaning and tailoring, printing press operators, and metal fabrication, rubber coating and chemical production workers 
<p>TRICHLOROETHYLENE</p>	<ul style="list-style-type: none"> • probably causes cancer • damages the liver and kidneys • causes headaches, dizziness and fatigue 	<ul style="list-style-type: none"> • in metal degreasing in the automotive and metal industries • as an industrial solvent • as a chemical intermediate to make products such as paint strippers, adhesives and rug cleaning fluids 	<ul style="list-style-type: none"> • metal manufacturers • aerospace industry • iron and steel pipe manufacturing • printing and support activities • textile furnishing and textile product mills • plastic product and footwear manufacturing • chemical and glue manufacturing • sewage treatment plants 	<ul style="list-style-type: none"> • metalworking machine operators, platers, metal sprayers and other workers who do metal degreasing, workers in metal fabrication plants, printing press operators, textile dyeing and finishing machine operators 
<p>VINYL CHLORIDE</p>	<ul style="list-style-type: none"> • causes cancer 	<ul style="list-style-type: none"> • to make polyvinyl chloride, which is then used to make plastic and vinyl products, including auto parts, pipes, medical supplies, packaging, wrapping film, furniture, construction materials, automotive upholstery and parts, wall coverings, and housewares such as shower curtains, plastic bags, window shades and toys 	<ul style="list-style-type: none"> • manufacturers that use polyvinyl chloride to make plastic and vinyl products 	<ul style="list-style-type: none"> • workers involved in PVC resin handling and processing, plumbers, construction workers, workers in auto manufacturing facilities and autobody shops

				
PRIORITY SUBSTANCES	HEALTH EFFECTS	USES	ASSOCIATED INDUSTRIES	AFFECTED WORKERS
<p>VOLATILE ORGANIC COMPOUNDS (VOCs) A group of approx. 1,000 compounds that can easily become vapours or gases. 12 of the ChemTRAC substances listed above are individual VOCs including:</p> <p>ACETALDEHYDE</p> <p>ACROLEIN</p> <p>BENZENE</p> <p>1,3 - BUTADIENE</p> <p>CARBON TETRACHLORIDE</p> <p>CHLOROFORM</p> <p>1,4 - DICHLOROBENZENE</p> <p>1,2 - DICHLOROETHANE</p> <p>FORMALDEHYDE</p> <p>POLYCYCLIC AROMATIC HYDROCARBONS</p> <p>TETRACHLOROETHYLENE</p> <p>TRICHLOROETHYLENE</p>	<ul style="list-style-type: none"> • combine with nitrogen oxides to create ozone or smog • ozone is linked to asthma and chronic bronchitis and emphysema • increase the risk of heart and respiratory problems • damages liver, kidney and central nervous system • some VOCs such as benzene cause cancer 	<ul style="list-style-type: none"> • as industrial solvents • in household products such as personal care products, air fresheners and cleaners • in furnishing' • in building materials such as paint, varnish and glue • sources also include gasoline, solvents and many household products such as solvents, paints and glues that contain solvents 	<ul style="list-style-type: none"> • dry cleaners • printing companies • various manufacturers 	<ul style="list-style-type: none"> • dry cleaners, printers, workers in various manufacturing industries 

Do your own research:

Find out more about these substances, their uses, their health effects and how they're regulated...

- Toronto Public Health's ChemTRAC - "Priority Substances: Health Effects and Sources" www.toronto.ca/health/chemtrac/substances.htm
- CAREX Canada www.carexcanada.ca
- New Jersey's Right to Know Hazardous Substance Fact Sheets www.nj.gov/health/eoh/rtkweb/documents
- Environment Canada Toxic Substances List www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=0DA2924D-1
- California Proposition 65 List www.oehha.ca.gov/prop65/prop65_list/Newlist.html
- Perkins + Will Precautionary List of Chemicals found in common building materials <http://transparency.perkinswill.com>
- ToxTown http://toxtown.nlm.nih.gov/text_version/chemicals.php
- Scorecard <http://scorecard.goodguide.com>