

Construction Exposure Profiles: Lead

Lead is a useful but very toxic metal. It is primarily used in lead-acid batteries, as well as in lead sheets, pipes, and pigments. Until the 1980s, lead was also used in paints due to its durability. There has been a decline in the use of lead over the past decades, however, construction materials containing lead may still exist in older buildings.

CAREX Canada estimates that

20,000

construction workers are exposed to lead in Ontario.

Health Effects

Workers can be exposed to lead by breathing in or ingesting lead dust, fumes, or mist. The health effects are the same regardless of method of exposure, but the body absorbs higher levels of lead when it is breathed in.

A worker can experience lead poisoning when exposed to high levels of lead over a short period of time, but low levels of exposure over time can also have serious health effects.

Symptoms from low level exposure may include:

- Abdominal pain
- Constipation
- Tiredness
- Headache
- Irritability
- Loss of appetite
- Memory loss
- Weakness
- Pain or tingling in hand and/or feet

And in some cases of severe lead poisoning:

- Peripheral neuropathy (damage to the peripheral nervous system)
- Cerebral edema (brain swelling)
- Encephalopathy (brain disorder, disease, or damage) leading to possible seizures, coma, and death

Other long-term symptoms of lead poisoning include:

- Depression
- Distraction, forgetfulness, irritability
- Nausea, vomiting, diarrhea, and/or constipation
- Kidney disease
- High blood pressure
- Atherosclerosis (thickening or hardening of the arteries)

- Heart disease
- Brain damage
- Weakened immune system
- Reproductive damage
 - Males: decreased fertility, changes in sperm quality, damage to the testes
 - Females: decreased fertility, miscarriage, premature birth, earlier age at the onset of menopause
- Damage to blood cells causing anemia
- Decreased lung function
- Asthma
- Obstructive lung disease
- Enlarged liver
- Altered thyroid hormone levels
- Macular degeneration (blurred or loss of central vision)
- Some evidence for stomach, lung, kidney, brain, and nervous system cancers

Exposure Sources and Construction Trades

In construction trades, lead can be found in the form of lead metal, lead coatings, and old lead paint. Construction occupations primarily exposed to lead in Canada include welders, plumbers, pipefitters, steel welders, and cutters.

Lead can be found in the following construction materials:

- Additive in brass and other alloys
- Cable and wire casing
- Cast iron pipes, gaskets, and connections
- Solder
- Flashing
- Lead glass and stained glass
- Paint, surface coatings, glazing and structural steel primer
- Some late 19th and early 20th century tinted mortar

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The following are examples of activities that can release lead and potentially expose workers:

- Abrasive blasting of surfaces containing lead
- Welding, cutting, soldering, or cleaning structures with lead coatings
- Demolishing materials containing lead
- Lead burning
- Dry sanding, scraping, grinding, or buffing surfaces containing lead
- Using power tools to remove lead coatings
- Repairing, renovating, or removing pre-existing structures that contain lead
- Removing, repointing, or disturbing lead-containing mortar

Prevention

The occupational exposure limit for lead in Ontario is 0.05 mg/m³ (milligrams per metre cubed) in air. However, over-exposure to lead is almost always measured in blood. In Ontario, new surveillance guidelines came into effect in 2020. Workers must be medically removed if their blood lead level measured twice one month apart is 1.0 µmol/L (micromole per litre) or if they have a single measure above 1.4 µmol/L.

There are also various prevention strategies that can be used in the workplace to reduce lead exposure in workers. Engineering controls such as barriers/enclosures, local exhaust ventilations, wet methods to reduce dust generation, and dust collection systems can reduce lead being released into the work environment. Appropriate education and training for workers, proper use of washing/decontamination facilities, and good housekeeping practices are examples of administrative controls. Finally, personal protective equipment such as eye protection, gloves, footwear, disposable protective clothing, and fit-tested respirators can also provide protection against lead exposure.

Work involving lead can be categorized into three types of activities: Type 1 (low), Type 2 (moderate) and Type 3 (high). The Ministry of Labour, Training and Skills Development provides guidelines for respirator requirements depending on the type of lead operation.

Use of these proper controls, work practices, and medical surveillance of workers can help to reduce the risk of possible adverse health effects and future exposure to lead.

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Resources

Ontario Ministry of Labour, Immigration, Training and Skills Development - Lead on Construction Projects:
<https://www.labour.gov.on.ca/english/hs/pubs/lead/>

Ontario Ministry of Labour, Immigration, Training and Skills Development - Part II: Medical surveillance program requirements for individual designated substances:
<https://www.ontario.ca/document/code-medical-surveillance-designated-substances/part-ii-medical-surveillance-program-requirements-individual-designated-substances>

CAREX Canada - Lead Profile:
<https://www.carexcanada.ca/profile/lead/>

Canadian Centre for Occupational Health and Safety - Lead on Construction Projects:
https://www.ccohs.ca/oshanswers/chemicals/lead_construction.html

WorkSafeBC - Lead:
<https://www.worksafebc.com/en/health-safety/hazards-exposures/lead>

To access this fact sheet and other health and safety and prevention information please visit:
www.obtworkplaceresource.com/health-safety