

Lead at the work site

OHS information for employers, supervisors and workers

Lead is a metal that is present in some Alberta workplaces. This bulletin introduces key properties, usages and health effects, and points to more information about legal requirements that support healthy and safe use of lead at your work site.

KEY INFORMATION

- Lead is a harmful substance. Over-exposure to lead can have serious health consequences.
- If lead is or may be present at your work site, health and safety requirements apply.
- Consult the *Occupational Health and Safety Act, Regulation and Code* to make sure you know and comply with all applicable requirements.

About lead

Lead is a bluish-grey metal that is naturally present in the earth's crust. It has a low melting point, is pliable and corrosion resistant, and is often combined with other elements such as zinc, silver and copper; the most common lead ore is lead sulphide (galena). Since lead is easily re-melted and refined, it has the highest recycling rate of all metals worldwide. Lead is used to manufacture a variety of consumer and industrial products and is present in many types of workplaces.

TABLE 1: LEAD AT THE WORK SITE

(This table lists some examples of where lead may be found in the workplace. It is not a definitive list.)

Occupation, industry or task	Where lead may be found
Artists and craftspeople (for example, jewelers or potters)	Lead solder, glazes or pigments; leaded glass
Battery or metal recycling	Lead-acid batteries, lead sheets, lead alloys such as lead-antimony
Chrome plating	Lead anodes
Construction, demolition or renovation	Lead paint, bricks or sheeting; lead glazed tiles; flashing, cladding or roofing materials
Electronics manufacturing or recycling	Lead solder, cathode ray tubes (funnel glass, glass frit)
Firearms or munition handling	Ammunition
Foundry, refinery or smelter work	Zinc lead content in raw material

Galvanizing or galvanized metal processing	Lead in molten zinc bath
Glass manufacture and recycling	Lead oxide in specialty and technical glass, CRT tubes, leaded or stained glass
Lead abatement workers	Lead paint, tile glaze or wall panels, solder from piping
Lead manufacturers and miners	Lead ore
Painters	Lead oxide (red lead) in primers for iron and steel
Plastics manufacturing, processing or recycling	Lead stabilizers (e.g., lead sulfate or stearate), pigments
Plumbers and pipe fitters	Solder, piping, fixtures, valves
Radiator and automotive repair technicians	Lead solder (e.g., in copper-brass radiators), lead-acid in batteries, lead wheel weights
Solid waste incineration	Lead in plastics or lined paper-packing material
Type-press printing, stamp production	Lead forms or type
Welders	Lead paint, lead-tin solders, galvanized metals

Health effects

Everyone is exposed to trace amounts of lead through air, soil, household dust, food, drinking water and various consumer products. Traces of lead can be found in many foods. These trace amounts are excreted or discarded through normal body processes and do not normally pose a health risk.

At work, lead can be present as a dust, fume or vapour. These may not have an odour, so you may not know if you're at risk for inhalation. As well, hand-to-mouth transfer is a risk: for example, through biting nails, using fingers while eating, or reflexively touching hands to face.

Absorption through the skin is also possible for organic forms of lead.

No matter the exposure route, normal body processes can't keep up when too much lead enters the body.

- High exposure to lead over a short time can cause acute effects.

Lead in the workplace

- Long-term exposure to lower doses of lead may cause chronic adverse effects.
- Both types of exposure may result in effects on multiple organ systems including the nervous, renal, cardiovascular, gastrointestinal, hematological and reproductive systems.

Additionally, bloodborne lead can accumulate in bone, where it can be stored for decades until it's later released back into the blood – for example, during pregnancy, during fracture healing, or because of aging or weight loss.

In general, the number and severity of symptoms worsen with increasing blood lead levels. The most severe symptoms can be life-altering or even fatal but even the mildest symptoms (for example, emotional irritability, difficulty concentrating and sleep disturbances) indicate that a worker should seek medical care and individual guidance from a qualified health professional.

SECONDARY EXPOSURES

Lead dust carried home from the workplace by contaminated clothing, shoes, and equipment can cause harm to family members and the public. Children are especially vulnerable because their smaller bodies and developing systems make them more susceptible to the effects of even low levels of lead exposure.

OHS requirements

Eliminate the hazard if you can

Employers must eliminate a hazard if it's [reasonably practicable](#) to do so. Elimination strategies may include:

- Using an alternate process that doesn't require lead.
- Using materials that don't contain lead.
- Abating lead-containing materials.

If you can't eliminate the hazard, OHS laws apply

If it's not possible to eliminate lead from the workplace, requirements in the Occupational Health and Safety (OHS) Code apply to its use. Learn more in the [Harmful substances in the workplace](#) bulletin.

Note that employers must have a code of practice in place when lead is present at a work site above

specific quantities. The [Harmful substances in the workplace](#) bulletin includes more information about this requirement, and a sample code of practice outline.

Additional requirements for controlling exposure to lead

Part 4 of the OHS Code puts additional requirements in place to control worker exposure to lead.

- Section 28 states that employers must:
 - Minimize the release of lead into the air.
 - Keep lead and waste materials containing lead from accumulating unnecessarily in work areas.
 - Ensure decontamination methods (for the work area, workers, equipment and personal protective equipment) prevent the generation of airborne lead.
- Section 29 sets out rules for restricted areas for lead work. These include rules about:
 - Authorized access.
 - Required signage (including signs that state eating, drinking and smoking are prohibited in the area).
 - Provision of personal protective equipment used as protective clothing, and ensuring workers' street clothing isn't contaminated.
 - Decontamination before leaving the restricted area.
 - Workers leaving the restricted area for a health and safety emergency.
- Section 30 sets out rules for laundering clothing used and re-used in restricted areas containing lead.

RESTRICTED AREA MEANS ...

"... an area of a work site where there is a reasonable chance that the airborne concentration of asbestos, silica, coal dust or lead exceeds or may exceed the occupational exposure limit for one or more of the substances;"

OHS Code, Part 1, Section 1

The eight-hour occupational exposure limit for lead elemental and inorganic compounds is 0.05 mg/m³. Other compounds – such as lead chromate – have different occupational exposure limits. Consult the OHS Code directly for occupational exposure limit values.

Examples of engineering controls that can reduce the release, accumulation or generation of airborne lead include:

- Wet scrapping /sanding for dust suppression.
- Negative pressure containments.
- Tool mounted shrouds.
- Local ventilation hoods to extract soldering fumes.
- Ultrasonic wet cleaning devices for cleaning firearms.
- Dust collection systems.
- Enclosures around work processes.
- Shear cutting instead of torch cutting.

(Note that Sections 28 and 29 also apply to asbestos, silica and coal dust, and Section 30, to asbestos.)

Lead exposure control plan

Per Section 41 of the OHS Code, employers must develop a lead exposure control plan if either of the following apply:

- A worker may be exposed to airborne lead above lead's occupational exposure limits for more than 30 days of the year.
- A worker's lead exposure (airborne or otherwise) could result in an elevated body burden of lead.

Section 41 of the code also sets out the minimum requirements for the lead exposure control plan. These are:

- A statement of purpose and individual responsibilities.
- Hazard identification, assessment and control methods.
- Worker education and training.
- Required (by the employer's hazard assessment) safe work practices.
- Hygiene and decontamination practices.
- Health monitoring processes (including biological testing).
- Documentation and record-keeping methods.
- Procedures for maintaining the plan, including annual reviews and updates.

Additionally, under Section 41, workers must follow their employer's lead exposure control plan and the hygiene practices established by the employer.

Monitoring for lead

Under Section 42 of the OHS Code, the employer must ensure that air monitoring and surface testing for lead is conducted regularly to confirm that the controls in place are effective if a worker may be exposed to lead in harmful amounts at the work site. A worker may be overexposed even if air monitoring does not show exposures above the OEL.

COMPETENT ASSESSMENT IS A MUST

Some employers may have in-house staff who are competent (that is, adequately qualified, suitably trained and sufficiently experienced) to assess exposures to harmful substances. Other employers may choose to hire a competent occupational health and safety consultant. **Competency is a legal requirement.** Learn more in [Occupational hygiene reports: requirements and tips](#).

As well, if a worker could reasonably be expected to have an elevated body burden of lead through any means (for example, through accidentally ingesting lead dust from contaminated hands), an employer must ensure blood lead level testing is available to the worker. Per Section 43 of the OHS Code:

- The employer must ensure the worker knows the testing is available, and the employer must pay for the cost of a blood level test.
- A worker may refuse the test (in writing), but the employer must not coerce, threaten or force a worker into doing so.
- An Alberta OHS officer, under the direction of an OHS Director of Medical Services, can require an employer remove the worker from further lead exposure if the worker's blood tests indicate lead poisoning.

Medical monitoring provides valuable information to protect workers from the health consequences of over-exposure to lead. If a worker's blood lead level is high or if the worker has lead poisoning symptoms, the worker's exposure must be controlled, or the worker may need to be removed from further lead exposure. Individual guidance from qualified health professionals is needed to guide further action.

Results of medical monitoring are also useful in evaluating the effectiveness of controls.

Elevated blood lead level is a notifiable disease

Under Section 30 of the OHS Act, a physician or other health care professional must [notify](#) an OHS Director of Medical Services when they find a person with a notifiable occupational disease, including blood lead level above 0.5 µmol/L.

CHECK THE RULES DIRECTLY

Always make sure you consult the *Occupational Health and Safety Act*, Regulation and Code directly to ensure you know all the rules that apply to you and your work site, including in relation to using lead at the work site.

Note that you can use the Government of Alberta's [OHS legislation search tool](#) to quickly find and download individual sections of the act, regulation and code. You can also save and share a personalized PDF with information that's relevant to your workplace.

For more information

Harmful substances in the workplace (GS022)
ohs-pubstore.labour.alberta.ca/gs022

Legal terms 101: "reasonably practicable" (LGT001)
ohs-pubstore.labour.alberta.ca/lgt001

Notifiable occupational diseases (MG030)
ohs-pubstore.labour.alberta.ca/mg030

Occupational hygiene reports: requirements and tips (GS019)
ohs-pubstore.labour.alberta.ca/gs019

Contact us

OHS Contact Centre

Alberta toll-free

- 1-866-415-8690

Edmonton region

- 780-415-8690

Deaf or hard of hearing (TTY)

- 1-800-232-7215 (Alberta toll-free)
- 780-427-9999 (Edmonton region)

Notify OHS of health and safety concerns

alberta.ca/file-complaint-online

Call the OHS Contact Centre if you have concerns that involve immediate danger to a person on a work site.

Report a workplace incident to OHS

alberta.ca/ohs-complaints-incidents

Website

alberta.ca/ohs

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