

Welding Fumes

Welding fumes, a serious inhalation occupational hazard for workers, are aerosols and gases released during welding processes. They have different harmful components that vary with materials involved and processes used such as metallic oxides of aluminum, beryllium, cadmium, chromium, iron, and lead, among others.

CAREX Canada estimates that 333,000 Canadians are exposed to welding fumes occupationally OR at work. Acute effects to welding fume exposure include irritation of the respiratory system and skin, kidney damage and emphysema.

Health Effects

- Lung Cancer
- Kidney Cancer

Acute exposures to welding fumes cause metal fume fever, which manifests with thirst, dry cough, a sweet or metallic taste in the mouth, chills, shortness of breath, malaise, muscle aches, headaches, nausea, and fever. They can also increase the risk of dermatitis and asthma.



Exposure Sources and Construction Trades

There are different types of welding processes used in construction with the highest exposure among sheet metal workers and welders. Shielded metal arc welding, general inert/active metal gas welding, flux-cored wire welding without shield gas, and autogenous flame cutting are among the highest producers of carcinogenic welding fumes. Sheet metal workers can be exposed while welding together sheet metal parts, flame-cutting sheet metal, and polishing up their welds. Boilermakers are also exposed to welding fumes while fusing, separating, or installing components and other related welding tasks. Construction trade helpers or general laborers have many duties some of which may involve working in proximity to welders, thus may be exposed to welding fumes on the job. It also is important to recognize that a variety of professions in construction may require tasks that involve working in proximity to these fumes. CAREX Canada reports that construction trades helpers and laborers are among the largest occupation groups exposed to welding fumes with estimates of 25,000 workers exposed.



Increased Risk

The Burden of Occupational Cancer project estimates that between 1961 and 2001, 375,000 people identified as having worked as welders and had been exposed to welding fumes. The Burden of Occupational Cancer project also estimates that workplace exposure causes 100 lung cancers annually in Ontario [ref national report]. The Burden of Occupational Cancer project also reports that approximately 310 lung cancer cases in Canada are attributed annually to workplace welding fumes exposure.

The Occupational Disease Surveillance System (ODSS) has identified specific construction trades in Ontario as having the highest risks for lung cancer when compared to all other workers in the ODSS, as shown in the following table.

Prevention

Currently, there are occupational limits in place for specific metal oxides found in welding fumes, such as nickel, chromium, beryllium which help to reduce exposure in workers.

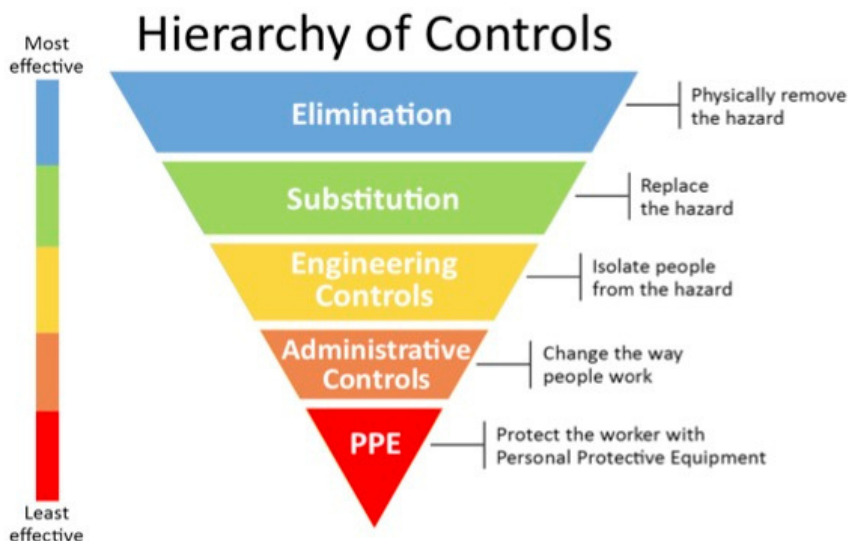
To reduce the risk of lung cancer, welding tasks and resulting fumes must be recognized, evaluated, and controlled. Ventilation and isolation of workers are engineering controls that can be used to reduce worker exposure. Regulations requiring ventilation for welding activities and the use of closed systems with properly maintained ventilation are needed. Local exhaust ventilation is recommended over general exhaust as it's a more effective way of containing welding fumes before they reach the workers' breathing zones and should be used at point sources of fumes.

Administrative controls should focus on rotating workers through areas of high exposure and reducing the time workers spend in enclosed spaces when doing welding tasks. Additionally, welding operations can be scheduled at times when the fewest employees are working. Adequate respiratory protection should be used but only be used when engineering controls, such as ventilation are not feasible.

Workers should be required to use adequate forms of PPE continued monitoring of appropriate PPE use is necessary in addition to other controls.

Percentages of Increased Risk among Trades

Trade	Lung Cancer
Welding and flame cutting operations	13%
Sheet Metal Workers	15%
Pipefitting, plumbing, and related	8%
Boiler makers and related	42%
Structural metal erectors	37%



ADDITIONAL RESOURCES



Canada Guide to Welding



IHSA Welding and Cutting Guide



WSPS Respiratory Hazards Article