Construction Exposure Profiles:

Welding Fumes

PROVINCIAL BUILDING & CONSTRUCTION TRADES COUNCIL OF ONTARIO

Welding fumes are a mixture of fine particles and gases produced through welding, a process that uses heat to fuse metals together. Coating and residues on the metal can also affect the composition and health effects of welding fumes. They can include metal working fluids, cadmium plating, chromates, vapours, lead oxide from primer paints, and plastic coatings.

CAREX Canada estimates that

31,000

Ontario construction workers are exposed to welding fumes.

Health Effects

Welding fumes cause lung cancer and may cause kidney cancer.

There are many health effects from inhaling welding fumes, including symptoms of nausea, dizziness, and irritation of the nose, throat, and eyes. Continuous long-term exposure to welding fumes could potentially lead to lung irritation, bronchitis, pneumonia, heart disease, and neurological problems.

Exposure Sources and Construction Trades

By occupation, the top two most exposed groups in Canada identified by CAREX Canada are welders and related machine operators and construction trades helpers and labourers.

Sheet metal workers may be exposed when welding together sheet metal parts, flame-cutting sheet metal or polishing welds. Boilermakers may be exposed when installing, fusing, or separating components. Other construction trades are also exposed when working with metal products, welding or working in close proximity to welders. Welding processes are performed by many industries that span across construction and building trades occupations and it is important to highlight their potential exposure to welding fumes. The International Agency for Research on Cancer estimated that people exposed to welding fumes may be 10 times higher than the number of people who have the job title of welder.

Occupational Disease Risks

According to the Occupational Cancer Research Centre burden of occupational cancer in Ontario report, workplace exposure to welding fumes causes 13 lung cancers annually in the construction sector.

Findings in the Table 1 below show the percent increase for lung cancer in specific construction occupations compared to all other workers in the Occupational Disease Surveillance System (ODSS).

Table 1. Increased risk of lung cancer in specific construction trades occupations compared to all other workers in the ODSS.

	Lung Cancer
Boilermakers, platers, and structural metal workers	42%*
Structural metal erectors	37%*
Roofing, waterproofing, related	25%*
Sheet metal workers	15%*
Other construction trades occupations	14%*
Welding and flame cutting	13%*
Pipefitting, plumbing and related	8%

**Statistically significant*

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Prevention

Although welding fumes have been classified as carcinogenic, no Canadian jurisdictions, including Ontario, have an exposure limit for overall welding fumes. However, occupational limits are in place for specific metals and metal oxides, such as chromium and nickel, identified in welding fumes to reduce exposure.

Although it would be difficult to eliminate welding fumes without eliminating welding, replacing working materials with less hazardous metals and cleaning surfaces to remove solvents, degreasers, and other hazardous substances may help to reduce the risk to workers. Engineering controls such as improved ventilation and local exhaust ventilation systems can remove fumes before they can be inhaled. Administrative controls can involve worker training and workplace monitoring/ sampling to keep track of exposure levels. Workers should also wear appropriate respiratory protection and other personal protective equipment such as eye protection.

As there is limited evidence on levels of exposure to welding fumes specifically in construction trades, further research is needed to understand the risks and prevention of exposure among construction workers.

This profile was prepared by the Occupational Cancer Research Centre in collaboration with the Ontario Building Trades Council with funding from the Ontario Ministry of Labour, Immigration, Training and Skills Development.

Occupational Cancer Research Centre

Resources

Canadian Centre for Occupational Health and Safety - Welding – Fumes and Gases:
https://www.ccohs.ca/oshanswers/safety_haz/welding/fumes.html

CAREX Canada - Welding Fumes Profile:
https://www.carexcanada.ca/profile/welding-fumes/

Government of Canada - Welding and allied processes - A guide to health hazards and hazard control measures:
https://www.canada.ca/en/employment-social-development/services/health-safety/reports/guide-welding.html

Infrastructure Health & Safety Association - Welding and Cutting:
https://www.ihsa.ca/rtf/health_safety_manual/pdfs/tools_and_techniques/Welding_and_Cutting.pdf

Canadian Centre of Occupational Health and Safety - OSH Answers Fact Sheets - Welding:
https://www.ccohs.ca/oshanswers/safety_haz/welding/

Occupational Cancer Research Centre - Burden of occupational cancer in Ontario:
https://www.cancercareontario.ca/sites/ccocancercare/files/assets/OCRCBurdenofOccupationalCancerReport.pdf

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