

Wildfire Smoke Protection & Compliance Game Plan



Smoke from wildfires is a perennial hazard that can affect not just firefighters and other emergency response workers in the immediate vicinity but those who are hundreds and even thousands of miles away in any part of Canada. While outdoor workers are the most vulnerable, wildfire smoke inhalation may also pose a hazard to those who work inside. And because it's a foreseeable hazard, OHS laws require employers to be prepared for and take appropriate measures to control it. Here's a briefing on the danger and the 5 steps you must take to manage it.

Defining Our Scope

Firefighters and other workers on the scene who respond to wildfire emergencies require extensive protection and equipment that's beyond the scope of this analysis. Instead, this Game Plan is designed to protect the vast majority of workers that wildfire smoke affects indirectly when it drifts into faraway areas and locations, such as neighbouring provinces or U.S. states.

The Dangers of Wildfire Smoke

Wildfire smoke is a complex mixture of gases, particles and water vapour containing a range of different pollutants and

toxic chemicals. The principal danger from wildfire smoke comes from the fine particles (PM2.5) that can get into the lungs and bloodstream and cause harmful health effects ranging from irritation of the eyes, nose and throat to reduced lung function, bronchitis, worsening of asthma, cancer and even death.

What OHS Laws Say about Wildfire Smoke Hazards

Although OHS laws don't specifically address wildfire smoke, employers have a duty to safeguard workers against the hazard. There are 4 sources of this implied duty:

i. The General Duty Clause

Every jurisdiction's OHS Act has a clause that requires employers to take reasonable measures to prevent and control recognized and foreseeable hazards in the workplace, including those not expressly mentioned in the regulations. That would clearly include exposure to wildfire smoke.

ii. General OHS Workplace Sanitation Requirements

Ensuring a supply of clean and breathable air is an implied duty under the parts of OHS regulations requiring employers to ensure that the workplace is generally clean and sanitary.

iii. Hazardous Emissions & Occupational Exposure Limits (OELs)

Employers must limit workers' exposure to hazardous airborne contaminants to safe levels specified for the particular substance in the OHS regulations. Contaminants subject to OELs contained in wildfire smoke typically include, among others,

sulphur dioxide, nitrogen dioxide, carbon monoxide, volatile organic compounds (VOCs) and ozone. However, these rules don't really work for wildfire smoke:

- The duty to limit workers' exposure targets airborne contaminants that employers actually emit, which isn't the case with wildfire smoke; and
- The elaborate technical precautions required to monitor and minimize levels of airborne contaminant exposure are designed for ongoing and foreseeable exposures whereas exposure to wildfire smoke is a temporary hazard that typically arises unexpectedly and lasts only a few days.

Compliance Pointer: In addition, although several jurisdictions, including BC, Manitoba, Northwest Territories, Nunavut and Saskatchewan, include protections against workplace exposure to tobacco smoke, these provisions don't apply to smoke from wildfires.

iv. Indoor Air Quality & Ventilation Requirements

Most jurisdictions specifically require employers to ensure that air in the workplace is properly ventilated using equipment and systems that meet industrial sanitation standards and are properly inspected, serviced and maintained. The problem is that exposure to wildfire smoke is a hazard primarily to those that work outdoors and [OHS ventilation requirements](#) typically pertain only to [indoor air quality](#) (IAQ).

Bottom Line: Protecting workers from exposure to wildfire smoke is a general and implied OHS duty requiring 5 basic measures.

Step 1. Assess Wildfire Smoke Hazards

The first step in controlling wildfire smoke hazards is to perform a general hazard assessment. The starting point is to recognize that wildfire smoke **is** a hazard that can affect any employer in any part of the country. So, what you need to do is assess how hazardous smoke would be to your own workers if and when it appears. Wildfire smoke can drift across countries and continents. The closer the worker is to the source of the smoke, the greater the health risks. Working outdoors increases the risks, especially for workers who perform strenuous activities.

Hazard assessment should also account for any of your workers who might be at increased risk from smoke hazards due to physical conditions or characteristics, including those:

- With cardiovascular conditions, asthma, lung cancer, chronic bronchitis or other lung diseases and respiratory conditions;
- Who are pregnant;
- Who smoke; and
- Who are seniors.

Compliance Strategy: Encourage workers to let you know if they're at high risk. And because these workers might need special protections, keep a list of the high-risk workers you identify.

Step 2. Monitor Air Pollution Hazards

You must be prepared to gauge the toxicity of the air if and when wildfire smoke descends on your workplace. The best way to do that is to rely on the air quality health index (AQHI)

(which you can track via receiving alerts from the free [WeatherCAN app](#)), which measures 3 outdoor air pollutants that may be harmful to health—ozone, nitrogen dioxide, and PM2.5—and lists a health risk score on a scale of 1 to 10, grouped into 4 categories:

- 1 to 3: low health risk;
- 4 to 6: moderate health risk;
- 7 to 10: high health risk;
- Over 10: very high health risk.

Recommended safety measures for these different risk categories varies, depending on whether the exposed worker is at high risk, as illustrated by this chart from the Canadian Government:

AQHI	Health Risk	Recommendations for At-Risk Workers	Recommendations for General Workers
1 to 3	Low	Perform usual outdoor activities	Ideal air quality for outdoor activities
4 to 6	Moderate	Consider reducing or rescheduling strenuous activities outdoors if worker is experiencing symptoms	No need to modify usual outdoor activities unless worker experiences symptoms such as coughing and throat irritation
7 to 10	High	Reduce or reschedule strenuous outdoor activities	Consider reducing or rescheduling strenuous outdoor activities if worker experiences symptoms such as coughing and throat irritation

AQHI	Health Risk	Recommendations for At-Risk Workers	Recommendations for General Workers
Above 10	Very High	Avoid strenuous outdoor activities	Reduce or reschedule strenuous outdoor activities outdoors, especially if worker experiences symptoms such as coughing and throat irritation

Source: Ministry of Environment and Climate Change Canada

Air Quality Health Index Risk Scale



The government reports AQHI scores each hour and issues special air quality advisories when rapid changes occur.

Step 3. Maintain Safe Environmental Conditions

Because wildfires are most likely to occur in the summer when conditions are dry, there's an excellent chance that outdoor workers exposed to smoke will also be exposed to extreme heat at the same time. The measures OHS laws require you to take to maintain thermal comfort in the workplace and [limit exposure to heat stress](#) will also work well for managing smoke hazards.

First Choice: Elimination

As with other hazards, follow the "hierarchy of controls" in deciding how best to protect workers from the wildfire smoke hazards you identify. If [reasonably practicable](#), completely

eliminate the hazard, such as by not performing outdoor operations when the AQHI level is above 6.

Engineering Controls

If elimination isn't reasonably practicable, use a combination of engineering and work/administrative controls and PPE to minimize smoke hazards. Engineering controls include air purifiers that use a High Efficiency Particulate Air (HEPA) filter to remove dangerous particles from the air. Look for a unit certified by the Association of Home Appliance Manufacturers (AHAM) and check the AHAM label for the suggested room size or clean air delivery rate (CADR) for tobacco smoke. The CADR should be equal to at least two-thirds of the area of the room or space in which you intend to use the air purifier. Stay away from air purifiers and furnace/HVAC air purifiers that produce ozone, such as electrostatic precipitators and ionizers. Other engineering controls you can use to make smoky air safer include:

- General ventilation;
- General or local air conditioning; and
- Convection, or use of fans to increase air flow.

Work/Administrative Controls

Use work controls that minimize smoke hazards by changing how the work is carried out, including:

- Developing an OHS policy
- and [safe work procedures for operating in smoky conditions](#);
- Scheduling outdoor jobs requiring heavy exertion for the early morning or late evening when the air is safer;
- Not assigning workers with physical vulnerabilities to outdoor work in smoky conditions;
- Letting workers take frequent water breaks;
- Making ample supplies [of cool \(10°C/50°F to 15.5°C/60°F\)](#)

[water](#), Gatorade or other cool liquid (except alcoholic beverages) available to workers in or near the work area and encouraging workers to drink small amounts frequently, like one cup every 20 minutes;

- Taking steps to cut the physical demands of work, e.g., use of lifting tools so workers don't have to manually carry heavy objects;
- Having workers operate in pairs so they can keep an eye on each other;
- Monitoring the pulse and other vital signs of exposed workers; and
- Ensuring that somebody is available at the scene who's trained to provide first aid in case workers exhibit dangerous signs or symptoms.

PPE

Supplying workers respirators may be necessary when smoke conditions are particularly hazardous and can't be properly controlled by engineering and work controls. Simple paper or cloth masks aren't enough to protect workers from breathing in wildfire smoke particles. You must use a filtering mask like the N-95 particulate filtering facepiece respirator. Workers at higher risk will likely need more advanced protection, including elastometric respirators (both full- and half-face types) fitted with a combination of organic vapour cartridge/P100 filter. Respirators must be fit tested and meet NIOSH or other required standards.

Step 4: Provide Appropriate Smoke Hazards Training

Before exposing them to wildfire smoke hazards, ensure workers receive training and instruction in:

- The hazards wildfire smoke poses;
- Recognition of risk factors, danger signs and symptoms;

- Safe work procedures and how to carry them out;
- Awareness of first-aid procedures for, and potential health effects of, dangerous smoke exposure; and
- Use of respirators.

Signs & Symptoms of Hazardous Smoke Inhalation

Tell workers who are exposed to wildfire smoke to seek immediate medical attention if they exhibit any of the following signs and symptoms:

- Persistent or worsening cough;
- Significant headache;
- Major nose, throat and sinus irritation;
- Unusual shortness of breath;
- Chest pain or tightness; or
- Significant weakness or fatigue.

Step 5. Investigate Worker Air Quality Complaints

Properly investigate [worker complaints about workplace air quality](#), particularly during periods when you're under wildfire smoke air quality advisories. (Note: Such investigations are a legal requirement under Federal and BC law to the extent the complaint relates to indoor air quality.) Specifically, a competent person should carry out an [air quality investigation](#) that includes, at a minimum:

- An assessment of the ventilation rate;
- Inspection of the HVAC system for cleanliness, operation and performance;
- Review of the HVAC system maintenance schedule; and
- Sampling for airborne contaminants suspected to be present.