

# Wildfire Smoke

## ACTSAFE SAFETY BULLETIN #48

Wildfire smoke can travel hundreds of kilometres and arrive on the wind without warning. It can be a health hazard for workers who work either outside or inside buildings or vehicles where the air is not filtered. This bulletin provides productions with guidelines to help performers and crew work safely when there may be exposures to wildfire smoke.

### WHAT IS WILDFIRE SMOKE?

*Wildfire smoke* is a mixture of air pollutants, including large amounts of fine particulate matter ( $PM_{2.5}$ ), which is the main hazard.  $PM_{2.5}$  consists of solid particles and liquid droplets suspended in air with an aerodynamic diameter of 2.5 micrometres or smaller.

Wildfire smoke also contains gases such as carbon monoxide, carbon dioxide, and nitrogen oxides. It may contain sulfur oxides, volatile organic compounds, and carcinogenic compounds.

### WHO IS AT RISK?

Most healthy adults will recover quickly from the short-term effects of temporary wildfire smoke exposure. Certain workers may, however, be at greater risk of experiencing health effects, including

vulnerable workers with respiratory or cardiovascular diseases, children, older adults, and anyone working outdoors for extended periods. A workers' risk may also increase if they smoke or are pregnant.

### POTENTIAL HEALTH EFFECTS

Harmful health effects from breathing the fine particles of  $PM_{2.5}$  can range from relatively mild signs or symptoms to more serious ones, or even premature death. Common signs or symptoms of mild exposure to smoke include:

- Sore throat
- Runny nose
- Eye irritation
- Mild cough
- Wheezy breathing
- Headaches

More serious effects can include:

- Reduced lung function
- Pulmonary inflammation

- Bronchitis
- Exacerbation of asthma and other lung diseases
- Exacerbation of cardiovascular diseases, such as heart failure

#### First aid

If anyone on a production experiences any of these symptoms or is concerned about smoke exposure, they should contact their supervisor or first aid attendant immediately and seek medical aid as necessary.



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### INDICATORS OF WILDFIRE SMOKE

#### PM<sub>2.5</sub>

PM<sub>2.5</sub> levels are a useful measure when discussing wildfire smoke and air quality because PM<sub>2.5</sub> is the main air pollutant in smoky conditions. Different regions use PM<sub>2.5</sub> levels and map them to their own air quality indices.

#### Air Quality Health Index (AQHI)

In British Columbia, the Air Quality Health Index (AQHI) uses a scale that ranges from 1 to 10+ ("low" to "very high"). The U.S. Environmental Protection Agency uses an Air Quality Index (AQI) that ranges from 0 to 500 ("good" to "hazardous").

#### AQHI+ adjustments

Because elevated smoke concentrations may result in the AQHI under-reporting the health risk, B.C. uses an adjustment to AQHI called AQHI+. This adjustment improves the accuracy of the reported health risk from smoke throughout the year.

The following table shows the smoke-optimized AQHI+ that is used in B.C. Productions should only use the information in this table when an area is affected by wildfire smoke.

#### Smoke-optimized AQHI+ risk categories for British Columbia

AQHI+ risk category	AQHI+ level	1-hour average PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Production guidelines to consider
Low	1	0–10	<ul style="list-style-type: none"> <li>Monitor PM<sub>2.5</sub> conditions and forecasts.</li> </ul>
	2	11–20	
	3	21–30	
Moderate	4	31–40	<ul style="list-style-type: none"> <li>Consider implementing exposure controls.</li> <li>Provide N95 respirators for voluntary use.</li> <li>If workers experience adverse symptoms, move them to a location where there is sufficient clean air.</li> </ul>
	5	41–50	
	6	51–60	
High	7	61–70	<ul style="list-style-type: none"> <li>Identify PM<sub>2.5</sub> exposure at the start of each shift and periodically thereafter.</li> <li>Implement a system of communicating wildfire smoke hazards.</li> <li>Train employees.</li> <li>Control exposures through engineering and administrative controls, and voluntary use of N95 respirators or respirators with higher assigned protection factors.</li> </ul>
	8	71–80	
	9	81–90	
	10	91–100	
Very High	10+	101+	



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When there are vulnerable workers (e.g., children or people with pre-existing conditions), the production may need to monitor the provincial AQHI more closely or have stronger controls in

place. For more information on guidelines, see the health alerts listed on the provincial [Air Quality Health Index](#) webpage.

## WILDFIRE SMOKE RESPONSE PLAN

Given the increasing frequency of wildfires in B.C., it's recommended that your production have a written wildfire smoke response plan in place to keep performers and crew safe.

A response plan should include information such as:

- Alternate shooting plans for avoiding outdoor activity at smoky locations ("weather cover")
- Training for workers to respond to smoky conditions, in accordance with the production's overall health and safety program
- Types of respirators to use for different levels of PM<sub>2.5</sub>
- Instructions for monitoring PM2.5 conditions and forecasts, and who is responsible for doing so.
- A communications plan for notifying workers of PM<sub>2.5</sub> conditions and forecasts
- Provisions for prompt medical treatment if workers are exposed to levels of smoke that may become hazardous

## CONTROL MEASURES

There are no specific exposure limit regulations for wildfire smoke in B.C., but employers should reasonably anticipate the likelihood of wildfire smoke and take steps to minimize worker exposure, especially vulnerable workers and performers who can't wear PPE.

The best way to minimize health risks is to avoid contact with smoke as much as possible. Here are some other ways to reduce risks.

### Monitoring

When wildfire smoke may affect a worksite, employers should monitor the B.C. AQHI+ — for example, by using a direct-reading particulate monitor to determine PM<sub>2.5</sub> levels or monitoring the AQHI+ through a website such as the province of B.C.'s Air Quality Health Index.

### Outdoors

- Minimize physical exertion as much as possible.
- Pay attention to air advisories and alerts.

- Provide air-conditioned and air-filtered shelters (e.g., rooms, tents, vehicles) that performers and crew can use during breaks.
- Reschedule outdoor work, if possible, or provide additional rest periods away from the smoke.
- Provide workers with PPE for voluntary use and appropriate training on how to use it.

### Indoors

- Use an HVAC system for indoor environments. Use high-efficiency filters and check them regularly.
- For smaller areas, consider using portable air cleaners with HEPA filters.
- Keep the building sealed as much as possible to keep smoke from entering.



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### High heat levels versus smoky conditions

If there are high heat levels in addition to smoky conditions, controlling heat stress should generally be prioritized over minimizing smoke exposure. This may mean opening a window to control the temperature even though it's smoky outside.

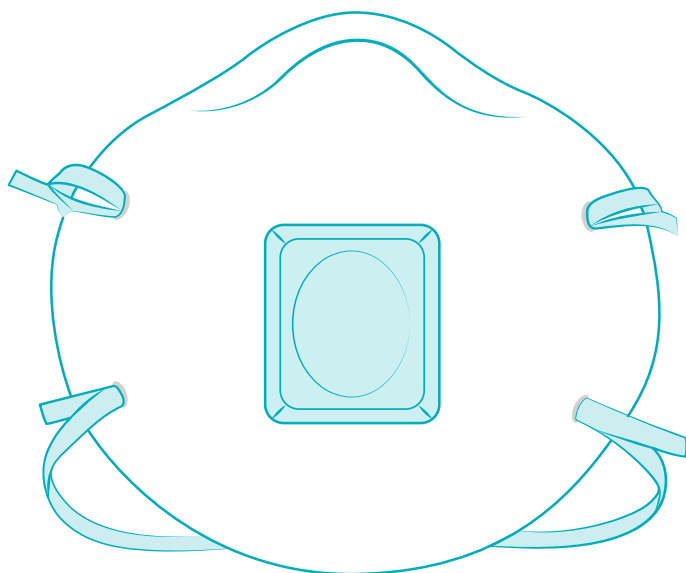
In any case, employers should implement controls any time that a heat warning is issued or during extreme heat events.

### In vehicles

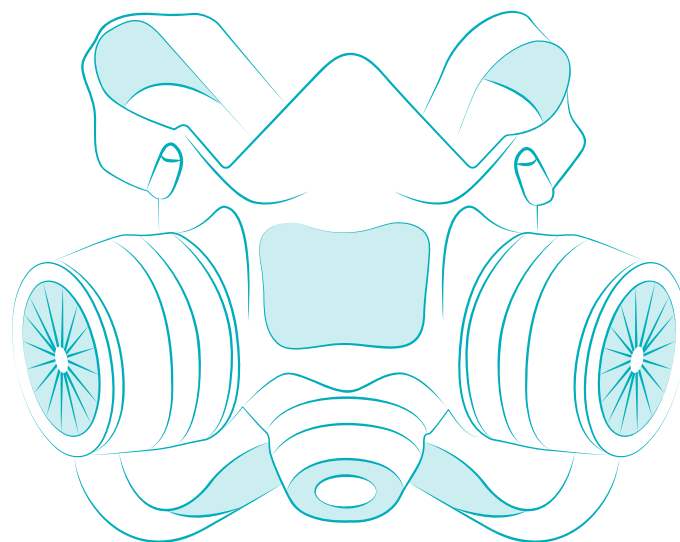
Workers who primarily work in vehicles are advised to keep vents and windows closed when it's smoky and, if available, operate the air conditioning in "recirculate" mode. Open the windows occasionally in areas where there is good air quality to prevent carbon monoxide buildup in the vehicle.

### Respirators

Respirators may be appropriate for some types of work. A good basic option is an N95-type particulate-filtering facepiece respirator. For additional protection, consider an elastomeric respirator (half-face or full-face) fitted with a combination organic vapour cartridge and P100 filter. For very high concentrations of wildfire smoke ( $PM_{2.5}$ ), a respirator with a higher assigned protection factor (APF) may be warranted. Workers should be trained and fit tested before using elastomeric respirators



N95 paper filtering facepiece



Half-facepiece respirator

Single-strap dust masks and surgical masks are not the same as the N95 masks that are approved by the U.S. National Institute for Occupational Safety and Health (NIOSH). Masks must meet WorkSafeBC requirements for respiratory protection.

**Note:** If performers are unable to wear respirators or other PPE (e.g., because of makeup or prosthetics), other control measures should be considered to keep these workers safe.



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### RELATED RESOURCES

- [Air Quality Advisories](#) (Province of BC — Environmental Protection and Sustainability)
- [Air Quality Health Index](#) (Province of BC — BC Air Quality)
- [Breathe Safer: How to Use Respirators Safely and Start a Respirator Program](#) (WorkSafeBC)
- [IATSE 891 Wild Fire app](#) (IATSE/Aura)
- [Safety Bulletin #35 — Preventing Heat-Related Illness](#) (Actsafes)
- [Wildfire Smoke](#) (BC Centre for Disease Control)
- [BC Wildfire Dashboard](#) (Province of BC — BC Wildfire Service)
- [Smoke Forecast](#) (BlueSky Canada)

### REGULATORY REFERENCES

- [Sections 4.13 to 4.18, Emergency preparedness and response](#)
- [Sections 4.70 to 4.80, Indoor air quality](#)
- [Section 5.2, General information requirement](#)
- [Sections 5.48 to 5.59, Controlling exposure](#)
- [Part 8: Personal protective clothing and equipment](#)

#### Actsafes Safety Association

Actsafes ([www.actsafes.ca](http://www.actsafes.ca)) is a not-for-profit health and safety association supporting British Columbia's arts and entertainment industries. Actsafes provides resources and training to employers, workers, and supervisors. We are always here to provide information relevant to best practices around health and safety in the arts and entertainment industries in B.C.

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