ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

**August 22, 2023**

**Poor Outdoor Air Quality and Workplace Health and Safety Consultation**
Health, Safety and Insurance Policy Branch
Ministry of Labour, Immigration, Training and Skills Development
400 University Avenue, 14th Floor
Toronto, ON M7A 1T

**Subject:** Poor Outdoor Air Quality and Workplace Health and Safety Consultation - Recommendations from the Ontario Society of Professional Engineers (OSPE)

The **Ontario Society of Professional Engineers (OSPE)** is the advocacy body and voice of the engineering profession. Ontario currently has over 85,000 professional engineers, 250,000 engineering graduates, 6,600 engineering post-graduate students, and 37,000 engineering undergraduate students. OSPE is pleased to respond to the Ministry's request for comments on the issue of poor outdoor air quality and workplace health and safety.

OSPE has identified several key recommendations to safeguard workers from the hazards associated with air pollution, your consideration of these recommendations is greatly appreciated.

**Recommendation 1: Adopt MERV-13 air filters**

The most important tool for mitigating the impact of wildfire smoke and outdoor air pollution on indoor environments is to upgrade filters in air handling units to MERV-13.[1] OSPE considers this one of our core recommendations for ensuring safer indoor air. This measure also aligns with the guidance provided by the **American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)** for protecting occupants during wildfire smoke events.[2]

Health Canada states that outdoor air pollution is the top environmental source for premature death and disability in Canada and advises keeping $PM_{2.5}$ levels as low as possible.[3,4]

**ASHRAE 62.1-2022** (6.1.4.2) [5] mandates the use of at least MERV-11 filters when outdoor $PM_{2.5}$ levels exceed the national standard. MERV-13 filters are preferable and should be compatible with most HVAC systems.[6] New air handling units should be provided with MERV-13 filters.

**Recommendation 2: Encourage appropriate respiratory protection for workers outdoors**

During wildfire smoke events, when working outside, workers should wear appropriate respiratory protection. At a minimum, the wearing of N95 masks should be encouraged to reduce inhalation of harmful particulates. Further information can be found in our guidance on face coverings.[1]

**Recommendation 3: Consider the use of portable air cleaners where required**

In cases where MERV-13 filters may not be feasible, or $PM_{2.5}$ levels remain elevated, or to comply with **ASHRAE 241-2023**, we recommend supplementing with portable air cleaners equipped with high-efficiency filtration, such as portable HEPA filters.

Properly sized activated carbon filters can assist in protecting against outdoor ozone [7] and volatile organic compounds (VOCs) during high pollution events like smog or wildfires. However, most portable air cleaners lack sufficient carbon and standardization of this technology is yet to be well established, so MERV-13 filters should always be considered the first line defence.

Transparency and ongoing monitoring of indoor air quality are vital to maintaining a safe workplace environment. $PM_{2.5}$ monitoring is essential, and we endorse the WHO's limits of a maximum average annual exposure of 5 $\mu g/m^3$ and maximum average daily exposure of 15 $\mu g/m^3$. [8]

**Recommendation 4: Avoid the use of alternative air cleaning technologies**

We advise against using alternative air cleaning technologies, for example, ionization, bipolar ionization, photocatalytic oxidation, gaseous hydrogen peroxide, hydroxyl generators and ozone generators.

These technologies are not appropriately regulated, and the long-term impacts of their use are unknown.

**Recommendation 5: Consider the impact of pollutants generated indoors**

While pollutants from outdoors are a significant concern, it is essential to also recognize the impact of pollutants generated indoors. Compliance with **ASHRAE 62.1-2022** can protect workers from indoor-generated volatile organic compounds (VOCs), including formaldehyde.

Moreover, the COVID-19 pandemic has highlighted the concerns with infectious aerosols. To address this, we recommend compliance with **ASHRAE 241-2023**, which calls for providing 15 liters/second/person in office settings while operating in infection risk management mode, offering an acceptably low level of risk. [9] Furthermore, monitoring $CO_2$ levels is crucial to ensure adequate ventilation. Compliance with **ASHRAE 62.1-2022** would equate with an average daily CO2 exposure of 1000 ppm.

For high-density offices where compliance with **ASHRAE 241-2023** is impractical through ventilation and filtration alone, upper room UV systems can provide an acceptable level of risk for mitigation of infectious aerosols.

In conclusion, the Ontario Society of Professional Engineers stands firm in its commitment to promoting the health and safety of workers. We believe that implementing these recommendations will significantly improve workplace conditions and protect workers from the adverse effects of poor outdoor air quality. We look forward to collaborating with the Ministry of Labour, Immigration, Training, and Skills Development to create safer working environments for all Ontarians.

Thank you for considering our suggestions and the expertise of OSPE's air quality subject matter experts.

If you have any further queries or require clarifications, please contact Paola Cetares, Manager of Public Affairs at pcetares@ospe.on.ca.

Sincerely,

Stephanie Holko, P.Eng., MBA
Chair and President
Ontario Society of Professional Engineers

Sandro Perruzza
Chief Executive Officer
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## References

[1] Ontario Society of Professional Engineers. (2023, March) Indoor air quality reports. Available :https://ospe.on.ca/indoor-air-quality/.

[2] T. Javins, et al., "Planning framework for protecting commercial building occupants from smoke during wildfire events," ASHRAE, Planning Framework Document, 2023. Available : https://www.ashrae.org/file%20library/technical%20resources/covid-19/guidance-for-commercial-building-occupants-from-smoke-during-wildfire-events.pdf

[3] Health Impacts of Air Pollution in Canada – Estimates of premature deaths and nonfatal outcomes, Health Canada, Ottawa, ON, Canada, March 2021. Available : https://www.canada.ca/content/dam/hc-sc/documents/services/publications/healthy-living/2021-health-effects-indoor-air-pollution/hia-report-eng.pdf

[4] Guidance for Fine Particulate Matter (PM2.5) in Residential Indoor Aiir, Health Canada, Ottawa, ON, Canada, 2012. Available : https://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/fine-particulate-particule-fine/alt/fine-particulate-particule-fine-eng.pdf

[5] ASHRAE, Ventilation and Acceptable Indoor Air Quality. PeachTree Corners, GA, USA: ASHRAE, 2022, vol. ANSI/ASHRAE Standard 62.1-2022. [Online]. Available: https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards

[6] H. Bohanon, M. McNulty, and M. Zataari, "Health impacts of indoor pm2.5 and need for particulate matter control in occupied spaces," ASHRAE Journal, June 2023. available : https://www.nxtbook.com/nxtbooks/ashrae/ashraejournal_AZSOFG/index.php?startid=32#/p/32

[7] M. Tang, J. A. Siegel, R. L. Corsi, and A. Novoselac, "Evaluation of ozone removal devices applied in ventilation systems," Building and Environment, vol. 225, 2022. Available: https://doi.org/10.1016/j.buildenv.2022.109582

[8] ASHRAE, Control of Infectious Aerosols. PeachTree Corners, GA, USA: ASHRAE, 2023, vol. ANSI/ASHRAE Standard 241. [Online]. Available: https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards

[9] W. H. Organization et al., WHO global air quality guidelines: particulate matter (PM2. 5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. World Health Organization, 2021, Available :https://www.who.int/publications/i/item/9789240034228.

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