

Volatile Organic Compounds (VOCs) Fact Sheet



FOR MAUI RESIDENTS IMPACTED BY WILDFIRES

What are Volatile Organic Compounds (VOCs)?

VOCs are chemicals that easily evaporate into the air. Examples of common VOCs include benzene, toluene, trichloroethylene (TCE), and perchloroethylene (TCE). VOCs are commonly used in consumer products (e.g., plastics, paints, cleaning products, adhesives) and can be released from building materials (e.g., carpet, linoleum, composite wood products, insulation). They can also be released into the environment in smoke from wildfires, building fires, and the burning of wood, oil, or gas.

VOCs in Drinking Water After Wildfires

VOC contamination might occur when wildfires impact the water distribution infrastructure (e.g., pipes, valves, meters), and the chemicals leech into the drinking water system.

Drinking water systems in California were shown to be contaminated with elevated levels of VOCs after wildfires in 2017 and 2018.

While exact causes are unknown, contamination after a wildfire may be possible due to:



Degradation of polyvinyl chloride (PVC), high density polyethylene (HDPE) or other plastic materials when exposed to heat.



Drops in water pressure due to broken water lines or strenuous water usage, where smoke, hot gases, and/or chemicals (i.e., VOCs) are sucked into water lines.

Contamination might occur without visible damage; thus water sampling analyses are the only way to accurately determine elevated levels of VOCs.

Safe levels of VOCs

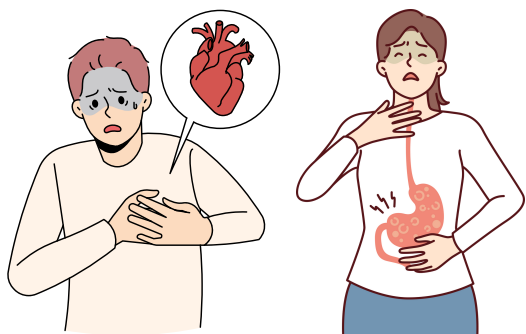
The US Environmental Protection Agency (EPA) establishes safe drinking water standards for VOCs in water

Chemical	US EPA Maximum Contaminant Level (parts per billion)*
Benzene	5
Carbon tetrachloride	5
p-dichlorobenzene	75
Trichloroethylene	5
Vinyl chloride	2
1,1,1-trichloroethane	200
1,1-dichloroethylene	7
1,2-dichloroethane	5
cis-1,2-dichloroethylene	70
Ethylbenzene	700
Chlorobenzene	100
o-dichlorobenzene	600

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VOCs & Health

While dependent on the specific chemical, there is risk of possible health concerns associated with VOC exposure:

- **Acute:** vomiting, stomach irritation, dizziness, sleepiness, convulsions, and rapid heart rate.
- **Long-term:** anemia, cancer, neurological effects, reproductive effects, and developmental effects.

Resources

- [Contamination of Drinking Water Distribution Systems \(epa.gov\)](https://www.epa.gov/dwregaffairs/contamination-drinking-water-distribution-systems)
- [Volatile organic compounds | Chemical Classifications | Toxic Substance Portal | ATSDR \(cdc.gov\)](https://www.cdc.gov/toxsubstances/)
- [EPA National Primary Drinking Water Regulations](https://www.epa.gov/dwregaffairs/epa-national-primary-drinking-water-regulations)
- Drinking water contamination from the thermal degradation of plastics: implications for wildfire and structure fire response. Isaacson KP, Proctor CR, Wang QE, Edwards EY, Noh Y, Shah AD, and Whelton AJ, Environmental Science: Water Research and Technology, 2021, 7, 274-284, <https://doi.org/10.1039/d0ew00836b>

Safe levels of VOCs

Chemical	US EPA Maximum Contaminant Level (parts per billion)*
Styrene	100
Tetrachloroethylene	5
Toluene	1,000
Trans-1,2-Dichloroethylene	100
Xylenes	10,000
1,2-dichloropropane	5
Dichloromethane	5
1,1,2-trichloroethane	5
1,2,4-trichlorobenzene	70

*Maximum Contaminant Level (MCL): highest level of a contaminant that is allowed in drinking water

QUESTIONS?

Hawai'i Poison Control Center: 1-800-222-1222
health.hawaii.gov/mauiwildfires

PLEASE FOLLOW ALL INSTRUCTIONS FROM LOCAL AUTHORITIES.

