

What You Should Know About CPAP Filter Degradation and Component Contamination in Wildfire Smoke Environments

"I am a CPAP user and I see more and more CPAP users in fire camp than ever before. Most of us are not aware of how much wildfire smoke impacts our health. The CPAP users I have spoken with throughout this fire season indicated they rarely change their filters out—let alone the plastic tubing and delivery mask that collects fine particles—and brings them home for additional exposure. Once we started looking at the high concentrations of PM 2.5 that we were now jet-blasting into our lungs, we were all on Amazon ordering stacks of filters and tubing!"

Jen Croft

Air Resource Advisor with the Interagency Wildland Fire Air Quality Response Program

(This program was created to directly assess, communicate, and address risks posed by wildland fire smoke to the public as well as fire personnel.)

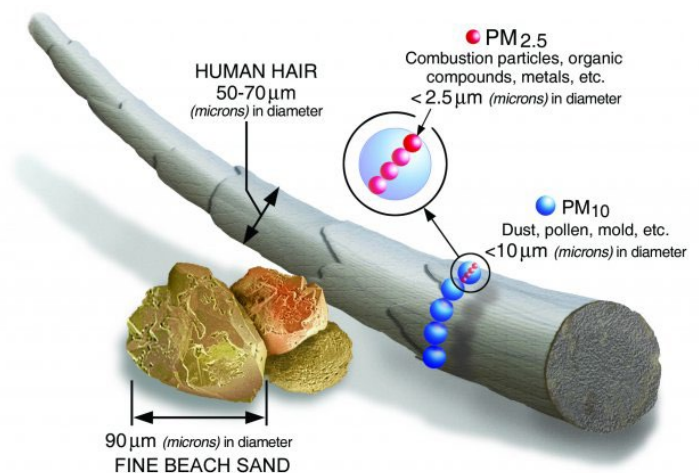
People using CPAP (Continuous Positive Airway Pressure) devices on wildfire assignments have reported that their equipment failed to provide therapeutic benefit within days of deployment. CPAP filters are rated for household air quality, not outdoor wildland fire air quality.

Wildfire smoke—particularly at Particulate Matter (PM) 2.5 concentrations sustained above $150 \mu\text{g}/\text{m}^3$ during active fire operations—saturates disposable and reusable CPAP filters within 24 to 72 hours. (This " $150 \mu\text{g}/\text{m}^3$ " concentration of micrograms per cubic meter means there are 150 micrograms of tiny solid or liquid particles suspended in every cubic meter of air.)

Once a filter is saturated, the device cannot generate adequate positive pressure. The therapy stops working and the user is not receiving treatment for their sleep apnea.

A clogged filter does not fail quietly. Reduced airflow forces the motor to overwork, generating heat, noise, and mechanical stress that accelerates device failure.

Clogged filters and contaminated equipment cause an increased delivery of harmful particles directly to the airway and increases the human health impacts to your lungs from related irritants and pollution. Clogged filters also cause decreased airflow rates and decreased oxygen exchange that will cause a decline in cognitive function and muscle recovery.



Lessons

- When a CPAP filter is clogged by smoke particulates, the device is no longer functioning as a medical device. Positive pressure is not being delivered. Sleep apnea is not being treated.
- Replacement filters are personal medical consumables. They are not stocked in fire camp, not available through supply, and not something medical staff can provide. Personnel are entirely responsible for their own filter supply.
- Plastic CPAP tubing is electrostatically attractive to smoke particles. Particles embed in the inner surface of the tubing and are not removable by rinsing or wiping. Contamination accumulates throughout your fire assignment.
- Nasal pillows, nasal masks, and full-face mask cushions are porous silicone. Smoke particles and volatile organic compounds from combustion adhere to and absorb into the silicone. These components cannot be adequately decontaminated in the field.
- Smoke particle contamination of tubing and mask components does not resolve at the end of a 14-day assignment. Personnel return home with equipment that will continue to deliver smoke-contaminated airflow until components are replaced—not cleaned, replaced.
- There is no field fix for a saturated filter or contaminated airway components. These are not problems that can be improvised around.



A brand new CPAP filter (bottom) and after four nights of use in “Very Unhealthy” PM 2.5 conditions (top).

Operational Guidance/Recommended Actions

AIR QUALITY INDEX (AQI)	ACTIONS TO PROTECT YOURSELF	LEARN MORE
■ Hazardous (H)	Everyone should avoid any outdoor activity	
■ Very Unhealthy (VU)	Everyone should avoid all physical outdoor activity	
■ Unhealthy (U)	People within Sensitive Groups should avoid all physical activity	
■ Unhealthy for Sensitive Groups (USG)	People within Sensitive Groups should reduce prolonged or heavy exertion	
■ Moderate (M)	Unusually sensitive individuals should consider limiting prolonged or heavy exertion	
■ Good (G)	None	
VIEW ONLINE FOR MORE INFORMATION https://www.wildlandfiresmoke.net		

Disclaimer: This forecast is based on fine particulates only; ozone is not included. Forecasts may be wrong; use at own risk. Use caution as conditions can change quickly. See your health professional as needed. Smoke sensitive groups should take appropriate precautions.

Become Familiar with Existing Monitors Near You: <https://fire.airnow.gov/>

CPAP Users — Before Every Assignment:

Pack a full assignment's worth of your CPAP disposable filters plus a minimum seven-day surplus. If your machine uses a reusable foam filter, bring at least three. Budget for daily replacement in heavy smoke. If you cannot carry that supply, you need to make a “Go/No-Go” decision about your equipment before deployment.

CPAP Users — During Your Assignment:

Inspect your filter every morning. If airflow sounds or feels reduced, replace the filter immediately—Do Not Wait. Keep unused filters sealed in a Ziplock bag away from smoke exposure until use.

Tubing and Mask Components:

Plan to discard and replace—not clean—your tubing and mask cushion or nasal pillows after any assignment involving sustained, heavy smoke. These components cannot be returned to a safe, uncontaminated state by rinsing or wiping.

If Your Filter Supply Runs Out:

You are without a functioning CPAP. Consult your personal physician prior to deployment about what to do if your device becomes inoperable. This is a personal medical decision—not a camp-level logistics or supply problem.

Supervisors: Check-in with personnel who rely on CPAP therapy and ensure that they mobilize with enough filters and spare components. If they don't, that's a "readiness gap" that directly affects their safety and performance. Encourage personnel to take care of themselves! Inadequate oxygen exchange reduces cognitive function and slows muscle recovery. Therefore, looking out for them helps them look out for the entire team.

This RLS was submitted by:

**Jen Croft, Air Resource Advisor
Interagency Wildland Fire Air Quality Response
Program**

Do you have a Rapid Lesson to share?

(<https://lessons.wildfire.gov/submit-a-lesson>)

**Share Your
Lessons**