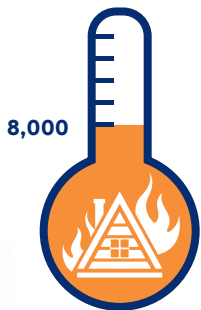


Beware the Toxic Twins: CO+HCN

Dangerous individually, significantly more harmful together

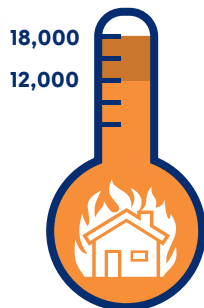
Smoke from structural fires produces many toxic gases, including **carbon monoxide (CO)** and **hydrogen cyanide (HCN)** – known as the “toxic twins.” Together, they create a chemical asphyxiant that can cause heart attacks.

Today's fires burn **2-3 x faster¹ and hotter** than natural materials, **speeding the release of toxic gases** such as **HCN**



In 1950, home furnishings (natural products such as cotton, wool and wood) burned at

8,000
BTUs/lb².



Today, typical home furnishings (polyurethane carpeting/cushions and polystyrene in TVs, hard plastic toys, etc.) burn at

12,000-18,000
BTUs/lb².



10:00
minutes

HCN levels of **200 ppm** are common in normal structural fires. That is **lethal in 10 minutes.**³

FACTS ABOUT HCN³

- HCN is 35 times more toxic than CO
- HCN can enter the body by absorption, inhalation, or ingestion and targets the heart and brain
- HCN can cause heart attacks and cardiac arrest, then hamper resuscitation
- HCN can cause bizarre and irrational behavior, hamper ability to perform role or to self-rescue, and can hinder or prevent rescue by others
- HCN can incapacitate a victim within a short time

SYMPTOMS OF HCN POISONING⁴

- Lethargy
- Weakness
- Shortness of breath, chest tightening, headache
- Drowsiness
- Disorientation, possibly bizarre behavior
- Cardiac issues
- Possibly bright red skin discoloration (for prolonged exposure)
- Soot or burns around the mouth and nose
- Coughing up carbonaceous sputum
- Smell of almond extract on the breath (anecdotal)

HOW CAN YOU PROTECT YOURSELF?

- **Wear PPE**
- **Always monitor the area for toxic gases**
- **Keep SCBA on until air is safe to breathe** and make SCBA available for drivers/operators
- **Shower in an hour** to reduce exposure to toxins by 90%
- **Decontaminate PPE** according to Fire & Emergency Training Institute (FETI) guidelines
- **Watch out for symptoms in fellow firefighters**, both at the fire scene and back at the station
- **Institute a training program** focusing on the hazards of hydrogen cyanide

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3. Cyanide: New Concerns for Firefighting and Medical Tactics. June 2009. Richard Rochford, FBI Performance Products e-newsletter
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