

Evolving Regulatory Changes for Carbon Monoxide Detection

What the Gas Appliance Industry Needs to Know

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Approximately 150 people in the United States die every year from accidental non-fire-related carbon monoxide (CO) poisoning.¹ Portable generators improperly located indoors or in semi-enclosed spaces are the leading cause of these fatalities. Traditional methods for preventing CO poisoning accidents include the installation of CO alarms in living spaces and the proper installation, maintenance, and use of fuel-burning appliances and products. For nearly two decades, the Consumer Product Safety Commission (CPSC) has also proposed that manufacturers of water heaters, furnaces, and other combustion appliances include additional technology to help prevent CO accidents.

In 2018, industry groups revised the standard to help mitigate the risk of CO poisoning from portable generators (ANSI/UL 2201) by requiring automatic shutoff technology.² This technology includes a CO detector on the side of the generator. As greater than 80% of non-fire-related CO deaths are caused by portable generators, manufacturers of these appliances have widely embraced testing and certification to this revised standard.² Now the Consumer Product Safety Commission (CPSC) is considering developing a rule that could mandate automatic shutoffs for residential furnaces and boilers, posing new technical challenges for manufacturers of those products.

The rule under consideration could require placing a sensor in an appliance's flue pipe to detect the presence of CO among other combustion products. However, there are fundamental differences between portable generators and fixed heating appliances such as how the exhaust is handled. These pose additional challenges for adding CO sensors and automatic shutoffs. Many

fixed gas appliance manufacturers and industry groups have voiced concerns as to whether currently available CO sensing technology can meet the required lifetime of an appliance, and they have expressed uncertainty regarding the impact this technology could have on other appliance performance requirements and failure modes. In particular, there are no CO detectors on the market that can reliably operate in the adverse environment of a heating appliance flue pipe.

It is important for gas appliance manufacturers to understand the implications the proposed shutoff technology could have on overall appliance safety and performance. The change in standards may also impact how disputes involving CO incidents are litigated. Our team at Exponent routinely performs engineering analyses to evaluate the safety of different technologies and the associated performance impact. We recently performed a Failure Modes and Effects Analysis (FMEA) to evaluate how changes to portable generator technology would affect the overall operability, safety,

¹ <https://cpsc.gov/Safety-Education/Safety-Education-Centers/Carbon-Monoxide-Information-Center>

² <https://www.ul.com/portablegenerators>

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and performance of the appliance. Our expertise in combustion science, air dispersion, exposure risk assessment, sensor/device communication, and large-scale statistical testing of product reliability enables us to evaluate the safety and performance of furnace and water heater technology in accordance with proposed CPSC regulations.

Exponent's Expertise

Our multi-disciplinary team of thermal scientists, electrical engineers, industrial hygienists, data scientists, and regulatory experts can help gas appliance manufacturers evaluate the safety and performance of new technology from beginning to end. We can also provide engineering analysis and expert opinions on how a product could have or should have been designed as part of CO-related litigation.



Daniel W. Mattison, Ph.D., P.E., CFEI

Thermal Sciences

Senior Managing Engineer

Menlo Park

(650) 688-7309 | dmattison@exponent.com



Timothy L. Morse, Ph.D., P.E., CFEI

Thermal Sciences

Senior Managing Engineer

Natick

(508) 652-8525 | tmorse@exponent.com

Alexandria | Atlanta | Austin | Bowie | Chicago | Denver | Detroit | Houston | Irvine | Los Angeles | Maynard | Menlo Park | Miami | Natick | New York | Oakland | Pasadena | Philadelphia | Phoenix | Sacramento | Seattle | Warrenville | Washington D.C. | United Kingdom | Switzerland | China | Singapore

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