extinguisher that meets the performance requirements of § 25.854(b).

16. OFAR Compartment Materials. Materials (including finishes or decorative surfaces applied to the materials) of OFAR compartments must comply with flammability requirements of § 25.853(a) as amended by Amendment 25–116. Seat cushions and mattresses must comply with the flammability requirements of § 25.853(c) as amended by Amendment 25–116 and the test requirements of part 25, appendix F, part II, or other equivalent methods.

17. OFAR Compartment Lavatory. An addition of a lavatory within the OFAR compartment requires the lavatory to meet the same requirements as a lavatory installed on the main deck except with regard to Special Condition 10 for smoke detection.

18. OFAR Compartment Stowage. Each stowage compartment in the OFAR compartment, except for under seat compartments for occupant convenience, must be completely enclosed. All enclosed stowage compartments within the OFAR compartment that are not limited to stowage of emergency equipment or airplane-supplied equipment (*e.g.,* bedding) must meet the design criteria described in table 1 of these special conditions. Enclosed stowage compartments greater than 200 ft^3 in interior volume are not addressed by this special condition. The in-flight accessibility of very large, enclosed, stowage compartments and the subsequent impact on the crewmembers' ability to effectively reach any part of the compartment with the contents of a hand-held fire-extinguishing system will require additional fire-protection considerations similar to those required for inaccessible compartments such as Class C cargo compartments.

TABLE 1—DESIGN CRITERIA FOR ENCLOSED STOWAGE COMPARTMENTS NOT LIMITED TO STOWAGE OF EMERGENCY OR AIRPLANE-SUPPLIED EQUIPMENT

Fire protection features	Applicability of fire protection requirements by interior volume		
	Less than 25 cubic feet	25 cubic feet to less than 57 cubic feet	57 cubic feet to 200 cubic feet
Compliant Materials of Construction [a]	Yes	Yes	Yes.
Smoke or Fire Detectors [b]	No	Yes	Yes.
Liner [c]	No	Conditional	Yes.
Fire Location Detector [d]	No	Yes	Yes.

a. Materials of Construction: The material used in constructing each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components (*i.e.,* 14 CFR part 25 Appendix F, Parts I, IV, and V) per the requirements of § 25.853. For compartments less than 25 ft.^{3} in interior volume, the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

b. Smoke or Fire Detectors: Enclosed stowage compartments equal to or exceeding 25 ft.^{3} in interior volume must be provided with a smoke or fire detection system to ensure that a fire can be detected within a one-minute detection time. The applicant must conduct flight tests to show compliance with this requirement. Each smoke or fire detection system(s) must provide:

(1) A visual indication to the flight deck within one minute after the start of a fire.

(2) An aural warning in the OFAR compartment.

(3) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the locations of flight attendants throughout the main passenger compartment during various phases of flight.

c. Stowage compartment liner.

(1) If the material used in constructing the stowage compartment meets the flammability requirements of a liner for a Class B cargo compartment (§ 25.855 at Amendment 25–116, and Appendix F, part I, paragraph (a)(2)(ii)), then no liner is required for enclosed stowage compartments equal to or greater than 25 ft.^{3}, but less than 57 ft.^{3} in interior volume.

(2) For all enclosed stowage compartments equal to or greater than 57 ft.^{3} in interior volume, but less than or equal to 200 ft.^{3}, a liner must be provided that meets the requirements of § 25.855 for a Class B cargo compartment.

d. Fire Location Detector: If an OFAR compartment has enclosed stowage compartments exceeding 25 ft.^{3} interior volume that are located separately from the other stowage compartments central location, such as the entry to the OFAR compartment or other common area, that OFAR compartment requires additional fire protection features and devices to assist a firefighter in determining the location of that fire.

Issued in Des Moines, Washington, on August 13, 2019.

Mary A. Schooley,

Acting Manager, Transport Standards Branch, Policy and Innovation Division, Aircraft Certification Service.

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CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Chapter II

[Docket No. CPSC–2019–0020]

Performance Requirements for Residential Gas Furnaces and Boilers; Advance Notice of Proposed Rulemaking

AGENCY: Consumer Product Safety Commission.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Consumer Product Safety Commission (Commission or CPSC) is considering developing a rule to address the risk of injury and death associated with carbon monoxide (CO) production and leakage from residential gas furnaces and boilers. This advance notice of proposed rulemaking (ANPR) initiates a rulemaking proceeding under the Consumer Product Safety Act (CPSA). We invite comments concerning the risk of injury associated with CO production and leakage from residential gas furnaces and boilers, the alternatives discussed in this ANPR, and other possible alternatives for addressing the risk. We also invite interested parties to submit existing voluntary standards or a statement of intent to modify or develop a voluntary standard that addresses the risk of injury described in this document.

DATES: Submit comments by October 18, 2019.

ADDRESSES: You may submit comments, identified by Docket No. CPSC–2019–0020, by any of the following methods:

Electronic Submissions: Submit electronic comments to the Federal eRulemaking Portal at: *www.regulations.gov.* Follow the instructions for submitting comments. The Commission does not accept comments submitted by electronic mail (email), except through *www.regulations.gov.* The Commission encourages you to submit electronic comments by using the Federal eRulemaking Portal, as described above.

Written Submissions: Submit written submissions by mail/hand delivery/courier to: Division of the Secretariat, Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814; telephone (301) 504–7923.

Instructions: All submissions received must include the agency name and docket number for this document. All comments received may be posted without change, including any personal identifiers, contact information, or other personal information provided, to: *www.regulations.gov.* Do not submit confidential business information, trade secret information, or other sensitive or protected information that you do not want to be available to the public. If furnished at all, such information should be submitted in writing.

Docket: For access to the docket to read background documents or comments received, go to: *www.regulations.gov,* and insert the docket number CPSC–2019–0020, into the ''Search'' box, and follow the prompts.

FOR FURTHER INFORMATION CONTACT: Ronald A. Jordan, Project Manager, Directorate for Engineering Sciences, U.S. Consumer Product Safety Commission, 5 Research Place, Rockville, MD 20850; telephone: (301) 987–2219; email: *rjordan@cpsc.gov.*

SUPPLEMENTARY INFORMATION: The CPSC [1] is publishing an ANPR to possibly develop a rule to address the risk of injury and death associated with CO production and leakage from residential gas furnaces and boilers.

I. Background

The Commission is aware of numerous injuries and deaths resulting from CO poisoning caused by residential gas furnaces and boilers. Gas-fired central furnaces and boilers historically have been among the leading causes of non-fire CO poisoning deaths associated with consumer products. To address this risk, CPSC staff reviewed incident data for residential gas furnaces and boilers and determined that residential gas furnaces and boilers were involved in a significant number of fatalities and injuries from CO poisoning. From 2013 to 2015, there were 57 deaths (average 19 deaths per year) related to residential gas furnaces and boilers reported to CPSC. In addition, an estimated 7,590 injuries related to CO poisoning associated with residential gas furnaces and boilers were reported to CPSC from 2013 to 2015.

In the late 1980s, the voluntary standards for a variety of gas appliances, including gas furnaces and boilers, were revised to address some of the operating, installation, or usage conditions of the products that could result in hazards, such as fire, explosion, and leakage of CO into the living space. Despite revisions to the voluntary standards that addressed some CO hazards, gas furnaces and boilers continue to be the second leading cause of CO deaths (portable generators are the leading cause of CO deaths [2] among all consumer products) and the leading cause among all heating systems. CPSC staff has advocated for more effective performance requirements for gas furnaces and boilers since 1993 to protect consumers from CO hazards that were not addressed by the voluntary standards for these products.

Starting in 2000, CPSC staff sought to address CO hazards at the source of production (*i.e.,* in the heat exchanger and flue passageways) in these appliances by working with voluntary standards organizations proposing [3] that that they add ''CO shutoff/response'' provisions to the voluntary standards. Despite repeated requests from CPSC staff for the U.S. standards development organizations (SDO) to address the CO risk at the source of production in gas appliances, and the existence of the Japanese and European performance requirements for CO and combustion product sensors, voluntary standards in the United States have not adopted similar requirements to address the CO hazard. The rationale U.S. SDOs cited for not adopting similar requirements is that the CO and combustion product-sensing devices needed to implement the requirements must have a 20-year lifespan and that no such devices are currently available.

The Commission is considering developing a mandatory standard to reduce the risk of death and injury associated with CO production and leakage from residential gas furnaces and boilers. CPSC staff prepared a briefing package to describe the products at issue, further assess the relevant incident data, examine relevant voluntary standards, and discuss options for addressing the risk associated with residential gas furnaces and boilers. That briefing package is available at: *https://www.cpsc.gov/s3fs-public/Draft%20ANPR%20-%20Performance%20Requirements%20for%20Residential%20Gas%20Furnaces%20and%20Boilers.pdf?izgUebOXOcPhQ51iScglAVrv0NbIb_rB.*

II. Relevant Statutory Provisions

To address the risk of injury associated with CO production and leakage from residential gas furnaces and boilers, the Commission is considering developing a mandatory safety standard. The rulemaking falls under the CPSA. 15 U.S.C. 2051–2089. Under section 7 of the CPSA, the Commission may issue a consumer product safety standard if the requirements of the standard are ''reasonably necessary to prevent or reduce an unreasonable risk of injury associated with [a] product.'' *Id.* 2056(a). The safety standard may consist of performance requirements or requirements for warnings and instructions. *Id.* However, if there is a voluntary standard that would adequately reduce the risk of injury the Commission seeks to address, and there is likely to be substantial compliance with that standard, then the Commission must rely on the voluntary standard, instead of issuing a mandatory standard. *Id.* 2056(b)(1). To issue a mandatory standard under section 7, the Commission must follow the procedural and substantive requirements in section 9 of the CPSA. *Id.* 2056(a).

Under section 9 of the CPSA, the Commission may begin rulemaking by issuing an ANPR. *Id.* 2058(a). The ANPR must identify the product and the nature of the risk of injury associated with it; summarize the regulatory alternatives the Commission is considering; and include information

[1] The Commission voted 3–2 to publish this document with changes in the **Federal Register**. Acting Chairman Anne Marie Buerkle and Commissioners Robert S. Adler and Elliot F. Kaye voted to approve publication of this document with changes. Commissioners Dana Baiocco and Peter A. Feldman voted to approve publication of this document as drafted.

[2] *Non-Fire Carbon Monoxide Deaths Associated with the Use of Consumer Products. 2015 Annual Estimates,* Hnatov, M. December 2018.

[3] Jordan, R., CO shutoff/response proposal letter Canadian Standards Association International, CPSC. November 2000.

about any relevant existing standards, and why the Commission preliminarily believes those standards would not adequately reduce the risk of injury associated with the product. The ANPR also must invite comments concerning the risk of injury and regulatory alternatives and invite the public to submit existing standards or a statement of intent to modify or develop a voluntary standard to address the risk of injury. *Id.* 2058(a).

After publishing an ANPR, the Commission may proceed with rulemaking by reviewing the comments received in response to the ANPR and publishing a notice of proposed rulemaking (NPR). An NPR must include the text of the proposed rule, alternatives the Commission is considering, a preliminary regulatory analysis describing the costs and benefits of the proposed rule and the alternatives, and an assessment of any submitted standards. *Id.* 2058(c). The Commission would then review comments on the NPR and decide whether to issue a final rule, along with a final regulatory analysis.

III. The Product

The ANPR covers residential, gas-fired central furnaces, boilers, wall furnaces, and floor furnaces (gas furnaces and boilers). These appliances are fueled by natural gas or propane (gas). Residential gas furnaces and boilers are vented gas heating appliances that are used to heat all categories of consumer dwellings, including single family homes, townhomes, condominiums, and multifamily dwellings, as well as small- to medium-sized commercial dwellings. These products provide heat to a dwelling by burning a mixture of fuel (either natural gas or propane) and air within the combustion chamber of a heat exchanger. As the mixture of fuel and air is burned, heat is released and transferred through the wall of the heat exchanger to the medium surrounding the heat exchanger and circulated through air ducts or water pipes throughout the dwelling, or into the ambient air to provide heat. Burning the mixture of fuel and air results in the formation of combustion products that are typically composed of oxygen, carbon dioxide, water vapor, and CO. When the mixture of fuel and air is burned completely, the concentration of CO produced should remain relatively low, typically below 50 parts per million (ppm), depending on the design of the gas appliance. The combustion products are exhausted to the outdoors through a vent system.

In a gas-fired central furnace, air is the medium that surrounds and is heated by the heat exchanger. A large fan is used to force the heated air across the exterior surfaces of the heat exchanger, through a duct system, and then the heated air exits the duct system through warm air registers in each room within the dwelling. In a gas boiler, water in the liquid phase or vapor phase (*i.e.,* steam) is the medium that surrounds and is heated by the heat exchanger. The heated water or steam is circulated, using a pump to force the fluid through a piping system to radiators in each room of the dwelling. Heat is transferred from the heated water or steam supplied to the radiators to the room through radiative and conductive heat transfer. Gas-fired central furnaces and boilers are considered central heating appliances, because they provide heat to each room of a dwelling. The combustion products of gas-fired central furnaces and boilers are vented to the outdoors, either vertically through the roof, or horizontally through a side wall through the vent pipe.

In addition to central gas-fired furnaces and boilers, the ANPR also covers gas wall furnaces and gas floor furnaces. As their names indicate, gas wall furnaces are installed in wall spaces, typically between the wall stud framing members; and floor furnaces are installed in the floor, typically between the floor joist framing members. Wall furnaces and floor furnaces both provide localized heating directly to the room in which they are located, and indirectly to adjoining rooms within the dwelling. The combustion products of wall furnaces are vented to the outdoors, either vertically through the roof, or horizontally through a side wall with the vent pipe running along the length of the wall studs between which the unit is installed. The combustion products of a floor furnace are typically vented horizontally through a side wall, with the vent pipe normally running along the length of the floor joists between which the unit is installed and through an exterior wall.

IV. Market Information

Of the gas appliances covered by this ANPR, central gas-fired furnaces are the type most commonly used in U.S. households. Natural gas and propane central furnaces are the primary heating equipment in 50.3 million homes; from 2.6 to 3.1 million units were shipped annually between 2013 and 2017. Gas boilers are the next most commonly used heating appliances in U.S. homes, accounting for the main heating source in 6.8 million U.S. homes and about 390,000 annual shipments. The average product life of gas furnaces (including boilers) ranges from 15 to 20 years. Floor and wall furnaces are less common than central furnaces and boilers, but they still accounted for heating in 800,000 U.S. homes. No annual shipment data were available for floor or wall furnaces.

V. Risk of Injury

A. Incident Data

1. Fatalities

In 2015, (the latest time period for which data are available) there were an estimated 175 unintentional, non-fire CO poisoning deaths associated with consumer products under the CPSC's jurisdiction.[4] Of that number, heating systems were associated with an estimated 37 (21 percent) of the deaths. Gas furnaces and boilers (liquefied petroleum, natural gas, and unspecified gas) were associated with the largest share of CO deaths (19 deaths or 51 percent) among heating systems and the second largest share (11 percent) among all consumer products. For the 11-year period, 2005 through 2015, gas furnaces accounted for 248 CO deaths (44 percent) among heating appliances, and 14 percent among all consumer products.

2. Injury Estimates

Staff estimates that annually there were about 1,850 gas furnace or boiler non-fire, CO-related injuries treated between 2013 and 2015 at U.S. hospital emergency departments (EDs).[5] Combined with estimates of medically attended injuries that were treated outside of hospital EDs, and using estimates from the CPSC's Injury Cost Model (ICM),[6] staff estimates an average

[4] *Non-Fire Carbon Monoxide Deaths Associated with the Use of Consumer Products 2015 Annual Estimates.* M. Hnatov. CPSC Directorate for Epidemiology. December 2018.

[5] Physicians have noted difficulty in correctly diagnosing these injuries (*e.g.,* Aniol, 1992). Carbon monoxide poisoning may mimic many conditions, including alcohol or drug intoxication, psychiatric disorders, flulike illnesses, and others conditions that can lead to misdiagnoses (ibid). Measurement of HbCO levels in the blood can also be confounded, based on the time elapsed and any breathing treatment administered that can lower counts before measurement. Absent an attempt to provide NEISS cases where carbon monoxide was diagnosed, however, it would not be possible to compute nonfatal injuries. Thus, a potential underestimate was deemed more practical than assuming the injury costs would be zero. Aniol, M.J. *Carbon Monoxide Toxicity: The Difficulty in Diagnosing This Leading Cause of Poisoning.* Can Fam Physician. 1992 2123–2134, 2174.

[6] The ICM is fully integrated with NEISS and uses empirical relationships between the characteristics of injuries and victims initially treated in hospital EDs and those treated elsewhere, to estimate the number of medically attended injuries treated outside of hospital EDs.

of 7,590 non-fire, CO-related injuries annually between 2013 and 2015, which were associated with gas furnaces and boilers. This includes the estimate from NEISS of 1,850 ED-treated injuries and an additional 5,750 medically attended cases not treated in EDs.

B. Hazard Patterns

CPSC staff routinely relies on in-depth investigations (IDIs) to understand failure modes and conditions that reportedly caused or contributed to incidents involving the production and leakage of dangerous levels of CO into the living space. For CO exposure to occur from a vented gas appliance, two conditions typically must exist. First, a condition must exist that prevents complete combustion of the fuel. Second, there must be a path or mechanism that allows or causes combustion products, including CO, to leak from the flue passageways or vent system of the gas appliance into the living space. In 2012, CPSC staff conducted reviews of CO-related IDIs that involved ''modern'' (*i.e.,* manufactured after 1989) gas furnace or boiler. [7] Of these incidents involving ''modern'' gas appliances, staff identified two primary concurrent hazard patterns for CO exposure:

- A condition that resulted in production of a hazardous level of CO by the appliance; and
- a condition that allowed hazardous CO to leak into a living space.

Staff confirmed that the failure modes that led to production of dangerous levels of CO included too much fuel (*i.e.,* ''overfiring'') to the appliance or inadequate air for combustion. The failure modes that led to leakage of CO into the living space included: Disconnected or breached vents; blocked vents, heat exchangers, or chimneys; depressurization of the space or back drafting of exhaust products; and improper venting. Staff also determined that the majority of the CO incidents occurred from appliances that were reported to be 15 years old or less at the time of the incident, and the average age of appliances involved in CO incidents was 9.6 years. The average age of the appliances indicates that these products were ''modern'' appliances equipped with the latest safety devices, and that these safety devices were not capable of protecting against CO exposure.

From review of CO-related IDIs, staff has been able to establish the following hazard patterns for gas appliances:

Incomplete combustion: Complete combustion of hydrocarbon fuels, such as natural gas or liquefied petroleum gas (LP-gas or propane), requires a proper mixture of air (*i.e.,* combustion air) and fuel, as well as an adequate amount of heat to ignite the combustion air-fuel mixture. Incomplete combustion of the fuel supplied to gas appliances can lead to production of hazardous levels of CO and can occur when the following conditions exist:

- *Inadequate combustion air:* Inadequate air for combustion supplied to an appliance occurs when: (1) Air openings to the appliance combustion chamber or burner assembly are blocked; (2) combustion air inlet piping (in the case of direct vent appliances) to the appliance is blocked; (3) the exhaust outlet from the appliance is blocked; (4) the appliance is installed in a room that does not have a large enough volume to provide the proper amount of air for combustion; or (5) the appliance is installed in a smaller room or closet that does not have adequately sized combustion and ventilation air openings to support proper combustion.
- *Too much fuel (i.e., over-firing):* Causes of over-firing can occur when the appliance gas manifold pressure is too high, causing the quantity of fuel delivered to the burner to be too high for complete combustion of the fuel/air mixture. This causes incomplete combustion of the fuel/air mixture and production of CO. This scenario can occur as a result of improper adjustment by a service technician or a product defect or component failure/malfunction associated with the gas valve or the burner orifice.
- *Reduced flame temperature:* Inadequate or reduced flame temperature can occur when the appliance burner is misaligned, causing the burner flame to come into contact with a metal surface within the combustion chamber. Because the metal surface is much cooler than the burner flame, direct contact will cause a greater rate of heat transfer from the flame to the metal, resulting in a reduction in the flame temperature (*i.e.,* flame quenching). Depending on the severity and duration, all of these conditions can result in incomplete combustion of the fuel.

Exhaust leakage: Combustion products from a gas furnace or boiler are normally vented to remove them from the home. However, a potential CO hazard in a home can arise when a path or mechanism exists that allows or causes CO to leak from the flue passageways or vent system of the gas appliance into the living space. Typical leakage paths include: (1) A totally or partially blocked vent, chimney, or heat exchanger; or (2) a disconnected vent pipe, or a hole in the vent pipe. Sometimes leakage can occur when an exhaust fan or fireplace is installed in the same room, or in a room adjacent to a gas appliance. The actions of the exhaust fan or a warm chimney created by the fireplace can have the effect of pulling air out of the room in which the gas appliance is installed. This action can depressurize the room, resulting in reverse flow of the combustion products through the appliance vent system or flue passageways. Instead of being vented safely to the outdoors, depressurization can cause combustion products, including CO, to spill into the living space. Other mechanisms that can lead to spilling include a vent with lower capacity than the gas appliance(s) connected to it. This can be caused by total or partial vent blockage, installation of a vent pipe that is too small, or the connection of so many appliances to the vent that the vent is rendered too small.

VI. Existing Voluntary and International Standards

A. U.S. Voluntary Standards

1. Description of Existing U.S. Voluntary Standards

The four gas appliance types within the scope of the ANPR are covered by the following domestic ANSI Z21 voluntary standards:

- ANSI Z21.13, *Standard for Gas-Fired Low Pressure Steam and Hot Water Boilers*

This standard specifies the construction and performance requirements for gas-fired, low-pressure steam and hot water boilers with input ratings of less than 12,500,000 Btu/hr (3,663 kW). The first edition of the standard was published in 1934 and has been revised several times, with the latest edition published in 2017.

- ANSI Z21.47, *Standard for Gas-Fired Central Furnaces*

This standard specifies the construction and performance requirements for gas-fired central furnaces with input ratings up to and including 400,000 Btu/hr (117 kW). The requirements for gas-fired central furnaces were initially included in ANSI Z21.13, before becoming a separate standard in 1964. From 1978 through 1993, a separate standard for direct vent central furnaces (ANSI Z21.64) was in place before being consolidated into a single standard and harmonized with Canadian standard requirements in 1993, with the latest edition published in 2016.

[7] Jordan, R., Updated Review of In-Depth Investigations Associated with Carbon Monoxide Poisoning and ''Modern'' Gas Furnaces and Boilers. CPSC. September 2012.

• ANSI Z21.86, *Standard for Vented Gas-Fired Space Heating Appliances*

This standard specifies the construction and performance requirements for vented gas-fired space-heating appliances with input ratings up to and including 400,000 Btu/hr (117 kW), including vented room heaters (Parts III and IV), gravity and fan-type direct-vent wall furnaces (Parts V and VI), gravity and fan-type wall furnaces (Part VII), gravity and fan-type vented wall furnaces (VIII), and gravity and fan-type floor furnaces for the United States only (Parts IX and X). The scope of this ANPR only includes gravity and fan-type direct-vent wall furnaces (Parts V and VI), and gravity and fan-type floor furnaces (IX and X). The ANSI Z21.86 standard was first published in 1998, with the latest edition published in 2016; however, individual standards for gravity and fan-type direct-vent wall furnaces and gravity and fan-type floor furnaces predate this standard and were likely covered in the first edition of ANSI Z21.13.

The voluntary standards listed above all require the appliances to:

• Not produce CO in excess of 400 ppm;

• shut off when vent or flue is fully blocked;

• shut off when blower door is not sealed properly (gas-fired central furnaces only);

• shut off if flames issue outside of the burner inlet openings.

2. Assessment of Existing U.S. Voluntary Standards

Despite the requirements of the ANSI Z21 voluntary standards, as well as a number of improvements to these standards that have been made over the years, these standards do not include requirements to protect against many of the failure modes or conditions that have been associated with production and leakage of CO into living spaces of U.S. households. Furthermore, the voluntary standards requirements do not address the long-term use of the products once installed in a dwelling or the various conditions that can cause or contribute to CO production and leakage. There are a number of leakage paths or mechanisms by which CO can leak into a living space; however, the ANSI Z21 standards for gas furnaces, boilers, wall furnaces, and floor furnaces only address leakage caused by a totally blocked vent. Staff has identified a variety of conditions that are not addressed by the ANSI requirements. Those conditions include, but are not limited to:

• Disconnected or breached flues, vents, and chimneys;

• partially blocked heat exchangers, flues, vents, and chimneys;

• over-fired appliances; and

• inadequate combustion air to appliances.

Based on the hazard patterns identified in the staff's review of fatal CO poisoning incidents involving gas appliances, requirements to address CO risk at the source of production, before potentially deadly levels of CO can enter the living space, would reduce the occurrence of CO-related deaths, injuries, and exposures associated with gas furnaces, boilers, wall and floor furnaces.

In 2015, CPSC staff proposed requirements for CO shutoff/response to the respective voluntary standards development organizations for gas-fired central furnaces, boilers, wall furnaces, and floor furnaces. Staff's proposal would have required the appliance to limit the production of CO below a threshold level, or for the appliance to shut off when CO emissions in the combustion chamber, flue passageways, or vent pipe exceed a hazardous level. The 2015 staff proposal was supported by the proof-of-concept testing [8] previously conducted by CPSC staff in 2001, 2004, and 2007, and by current standards for gas appliances in Europe and Japan, which include similar requirements to use combustion sensors to regulate CO production and shut down the appliance or modulate its performance if CO production exceeds a specified safe level. To date, no revisions to the ANSI Z21 voluntary standards have been made that incorporate staff's proposed performance requirements to address the hazard patterns discussed above. Therefore, the existing ANSI Z21 voluntary standards currently do not adequately address the risk of injury and death associated with CO production and leakage from residential gas furnaces and boilers for the reasons discussed above.

B. International Standards

1. Japanese Gas Appliance Standards

The primary gas heating appliances used in Japan appear to be gas water heaters, gas boilers, and gas space heaters. Based on our limited review of the Japanese gas appliance market, instantaneous, tankless gas water heaters appear to be more common than traditional gas water heaters with storage tanks. The governing voluntary performance and safety standards for these appliances in Japan are:

• JIS–S–2109—*Gas burning water heaters for domestic use*

• JIS–S–2112—*Gas hydronic heating appliances for domestic use* [9]

• JIS–S–2122—*Gas burning space heaters for domestic use.*

These Japanese Industrial Standards (JIS) have explicit performance requirements for vented gas water heaters, gas boilers, and gas space heaters that require shutoff of the appliance in response to CO levels above a certain threshold (*i.e.,* 300 ppm CO). The CO-detection strategies used by Japanese manufacturers include detection of CO within the combustion chamber of the appliance and shutoff or combustion control in response to detection of hazardous levels of CO.

Although gas water heaters are not within the scope of the ANPR, the Japanese standard, JIS–S–2109, is relevant because the combustion process and technology involved in heating water is similar to the combustion process and technology used for gas furnaces and boilers sold in the United States. In addition, the Japanese standard's CO shutoff requirements are similar to CPSC staff's 2000 and 2015 CO shutoff/response proposals, and the CO detection and combustion components are applicable to gas furnaces and boilers sold in the United States.

To protect against CO exposure, JIS–S–2109 includes requirements that vented gas water heaters be equipped with what they call an ''Incomplete Combustion Prevention Device'' (ICPD). A gas appliance experiencing incomplete combustion means that the fuel is not being burned or combusted completely, and as a result, can produce elevated concentrations of CO. Section 7.7.6 of JIS–S–2109, Incomplete Combustion Preventive Device of FE includes requirements that the water

[8] This testing was initially used to support a CO shutoff/response requirements proposed by CPSC staff to the same voluntary standards organizations in 2001.

[9] JIS–S–2112 and JIS–S–2122 were not available in English. To confirm the existence of incomplete combustion preventive device requirements with these standards, the table of contents and sections of the standards pertaining to incomplete combustion, carbon monoxide, and CO were translated from Japanese to English using: *https://www.bing.com/search?q=translate+from+japanese+to+english&form=IENTHT&mkt=en-us&httpsmsn=1&refig=ffc0d5a3070d45d3c5187baeb690b6dd&sp=1&ghc=1&qs=AS&pq=translate+from+japanese+to+english&sc=8-34&cvid=ffc0d5a3070d45d3c5187baeb690b6dd.* Staff's partial translation and review of these standards confirmed that they both included requirements for devices to prevent incomplete combustion to protect against CO poisoning and that were consistent with the requirements in JIS–S–2109.

heater shut off when CO concentrations reach 0.03 percent (300 ppm) [10] in:

- The room in which the water heater is installed; and
- the adjacent room.

According to the Japanese Standards Association (JSA), the Incomplete Combustion Preventative Device provisions in JIS–S–2109 have been required since 2001. JSA also indicated that JIS–S–2109 does not have separate performance standards for ICPDs, requirements for a minimum life span for the device, and that these devices are replaced, if necessary, based on use and functionality. All of the performance requirements for ICPDs are specified in JIS–S–2109. In addition, JIS–S–2109 includes flame roll-out and blocked vent requirements (respectively, similar to the Flame Roll-Out and Blocked Vent Safety requirements in ANSI Z21.13 and ANSI Z21.47).

Another similarity between the ICPD requirements of JIS–S–2109 and CPSC staff's 2000 and 2015 CO shutoff/response proposals is that they both necessitate that the device be within the harsh environment of appliance combustion chamber, flue passageways, or vent system.

2. European Gas Appliance and Combustion Sensor Standards

Gas boilers are a common space-heating appliance used throughout Europe in residential settings, and they are similar in design and function to residential gas boilers certified to ANSI Z21.13 and sold in the United States. The relevant European Committee for Standardization (CEN) domestic gas boiler standards are:

- EN 15502–1, *Gas-fired heating boilers, Part 1: General requirements and tests;*
- EN 15502–2–1, *Gas-fired central heating boilers, Part 2–1: Specific standard for type C appliances and type B2, B3 and B5 appliances of a nominal heat input not exceeding 1000 kW;* and
- EN 15502–2–2, *Gas-fired central heating boilers, Part 2–2: Specific standard for type B1 appliances.*

These standards (EN 15502–1, EN 15502–2–1, and EN 15502–2–2) include requirements to ensure the proper supply of combustion air and gas to the combustion process (*i.e.,* air proving) through the use of one of the following mechanisms:

- Carbon Monoxide (EN 15502–1, EN 15502–2–1, and EN 15502–2–2);
- Supervision of the combustion air pressure or the combustion products pressure (EN 15502–1);
- Supervision of the combustion air rate or the combustion products rate (EN 15502–2–1 and EN 15502–2–2);
- Gas/air ratio control (EN 15502–1, EN 15502–2–1, and EN 15502–2–2); or
- Indirect supervision (*e.g.,* fan speed supervision) (EN 15502–1).

The second and third bullets listed above, Supervision of the combustion air rate or the combustion products rate, and Gas/air ratio control, are the most similar to CPSC staff's 2000 and 2015 CO Shutoff proposals to the ANSI Z21/83 Technical committee and furnace and boiler subcommittees. Additionally, these standards include performance requirements for blocked vents.

These standards also have combustion product discharge provisions, which are similar to the Flame Roll-Out provisions of the ANSI standards (*i.e.,* ANSI Z21.13 and ANSI Z21.47).

In addition to the common requirements for all three of the standards, EN 15502–2–1 also includes test conditions and CO emission limits for: Boilers without gas/air ratio controls (Section 8.12.2.101) and Boilers using gas/air ratio controls (Section 8.12.2.102). Both requirements specify that the maximum permissible CO concentration not exceed 0.10 percent (1,000 ppm). EN 15502–2–2 includes a provision, Section 8.12.101, Supplementary test for natural draught boilers, which specifies that the maximum permissible CO concentration not exceed 0.10 percent (1,000 ppm).

Unlike the JIS standards, the CEN includes separate standards for combustion monitoring devices and controls that are used in domestic gas boilers. The relevant CEN standards are:

- EN 13611, *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels—General requirements*

This standard specifies the general safety, design, construction, and performance requirements and testing for safety, control, or regulating devices use for burners or appliances burning gaseous or liquid fuels. The standard is designed to be used in conjunction with the various CEN standards that govern the above types of control devices. Because they address combustion process monitoring and modulation, EN 12067–2 and EN 16340 are of particular relevance to this ANPR.

- EN 12067–2, *Gas/air ratio controls for gas burners and gas burning appliances—Part 2: Electronic types*

This standard specifies the safety, construction, and performance requirements for closed-loop electronic gas/air ratio control systems (GARCs) for use with gas burners and gas-burning appliances. A GARC provides the electromechanical interface to the burner or the gas valve and the combustion air supply that allows these devices to be modulated or controlled to increase or decrease gas flow or combustion air flow. This allows the GARC to maintain the combustion efficiency of the appliance by monitoring and maintaining an optimal gas/air ratio. An optimal gas/air ratio ensures that the gas/air mixture supplied to the appliance burner is burned completely, thereby maintaining combustion efficiency.

- EN 16340, *Safety and control devices for burners and appliances burning gaseous or liquid fuels—Combustion product sensing devices*

This standard specifies the safety, construction, and performance requirements for combustion product-sensing devices (CPSD) designed to measure combustion products, as part of combustion control systems for burners and appliances that operate by burning gaseous or liquid fuels. This standard covers sensing devices that measures CO, as well as other flue gases. This standard is designed to be used in conjunction with EN 13611, Safety and control devices for burners and appliances burning gaseous and/or liquid fuels—General requirements.

We note the similarities to CPSC staff's voluntary standards CO Shutoff/Response proposals. EN 16340 is compatible with CPSC staff's CO shutoff/response proposals because it establishes performance requirements for a device that monitors: (1) Within the same parameters (*i.e.,* combustion gases, including CO); and (2) within the same harsh environment (*i.e.,* the combustion chamber). Consequently, these devices are subject to the same harsh operating conditions (*i.e.,* high operating temperature, relative humidity, combustion gases, thermal cycling) that the Z21/83 Technical Committee and its subordinate technical subcommittees (for gas furnaces and boilers) and CO/combustion sensor working groups raised questions about in response to CPSC staff's 2000 and 2015 CO shutoff/response proposals.

3. International Standards as Examples of Technological Feasibility

A lack of technological feasibility can be a barrier to implementing a new or proposed standard. Therefore, CPSC staff has sought to identify technologies that might be capable of implementing the staff-recommended CO shutoff/response proposals made to voluntary standards groups in 2000 and 2015. In addition, staff has also assessed

[10] 0.03 percent converts to 300 ppm CO by multiplying 0.03 percent by 10,000.

international standards that required the same or similar performance requirements as staff's 2000 and 2015 CO shutoff/response proposals. The Japanese and European standards discussed above identify several gas-sensing technologies that are being used for CO shutoff or combustion control of residential gas appliances in Japan and Europe. As discussed, the CO-detection strategies used by Japanese manufacturers include detection of CO within the combustion chamber of the appliance and shutoff or combustion control in response. In Europe, residential gas boilers are required to meet certain combustion-efficiency requirements, as well as CO safety requirements. The combustion-control strategies used by European gas boiler manufacturers are often accomplished by monitoring the gas/air mixture, the combustion flame, or the concentration of CO, oxygen, or carbon dioxide within the combustion products. The combustion-control strategies are also used to detect CO, but rather than shutting down the appliance, CO production is either prevented or limited by modulating the appliance's operation. The Japanese and European standards do not specify a minimum lifespan for sensing devices used to implement their respective CO safety and combustion efficiency requirements.

The Japanese and European standards demonstrate that it is technologically feasible, using current technology, to address the hazard patterns identified by staff regarding CO poisoning in a safety standard. The Japanese and European standards discussed above are examples of existing international standards that address the risk of injury and death associated with CO production and leakage from residential gas furnaces and boilers that are the subject of this ANPR.

VII. Regulatory Alternatives the Commission Is Considering

The Commission is considering several alternatives to address the risk of death and injury associated with CO poisoning from residential gas furnaces and boilers.

A. Mandatory Standard

The Commission could develop a rule under the CPSA establishing performance requirements and/or warnings and instructions for residential gas furnaces and boilers to prevent or reduce an unreasonable risk of death or injury associated with the production and leakage of CO from these products.

B. Rely on Voluntary Standards

The Commission could continue to address the hazard through voluntary standards, ANSI Z21.13, ANSI Z21.47, and ANSI Z21.86, and continue to work to develop more effective voluntary standard requirements to address the identified hazards, instead of issuing a mandatory rule. However, as previously discussed, the Commission preliminarily believes that the existing ANSI standards do not adequately reduce the risk of injury associated with residential gas furnaces and boilers. The Commission is assessing the level of compliance with the voluntary standards.

C. Reliance on Recalls

The Commission has recalled residential gas furnaces and boilers related to CO leakage hazards. The Commission could continue to conduct recalls, both voluntary and mandatory, instead of promulgating a mandatory rule. However, recalls may not be as effective at reducing the risk of injury as a mandatory standard. Recalls only apply to an individual manufacturer and product and do not extend to similar products. Additionally, recalls can only address products that are already on the market, and cannot prevent unsafe products from entering the market.

D. Information and Education Campaign

The Commission could continue to issue annual and semi-annual news releases warning consumers about the dangers of CO poisoning and promoting the importance of consumers getting annual safety inspections of their residential fuel burning heating systems.

VIII. Request for Comments and Information

The Commission requests comments on all aspects of this ANPR, but specifically requests comments regarding:

- Information or analysis regarding mechanisms or performance requirements to mitigate more effectively the following hazard patterns that lead to CO production and leakage:
  - Inadequate air for combustion supplied to the appliance;
  - Too much fuel supplied to the appliance burner (*i.e.,* over-firing);
  - Reduction of burner flame temperature below the ignition temperature of the combustion air-fuel mixture (*i.e.,* flame quenching);
  - Disconnected or breached vent pipe, chimney, heat exchanger, or flue passageway;
  - Partially blocked vent pipe, chimney, heat exchanger, or flue passageways;
  - Snow blockage of side-wall vented gas appliances;
  - Improperly sized vent pipes; and
  - Depressurization of the room in which the gas appliance is installed.
- Studies, tests, analysis, or surveys performed to evaluate the effectiveness of gas-sensing and shut-off devices and performance standards, laws, or codes in reducing carbon monoxide fatalities and injuries associated with the use of domestic gas furnaces, boilers, water heaters and other gas heating appliances in Europe and Japan;
- Studies or analysis of the costs of incorporating carbon monoxide sensors or combustion controls systems into residential gas furnaces, boilers, or water heaters in Japan, Europe, or the United States;
- Studies or analyses that evaluate secondary cost impacts of using gas-sensing and shut-off devices in reducing carbon monoxide fatalities and injuries associated with the use of domestic gas furnaces, boilers, water heaters, and other gas heating appliances in Europe and Japan;
- Studies or analyses that evaluate the impact of carbon monoxide fatalities and injuries associated with the use of domestic gas furnaces, boilers, water heaters and other gas heating appliances in Europe and Japan;
- Data or analyses on the alternatives the Commission is considering, including the cost and effectiveness of the CO shutoff/response requirements under consideration;
- Studies, test, or analyses that correlate the effects of incomplete combustion to carbon monoxide production and changes in the combustion efficiency of natural gas and propane appliances.
- Information on any factors or trends that, independent of any CPSC rulemaking, could act to reduce (or increase) CO poisoning associated with gas furnaces, boilers, wall furnaces, and floor furnaces described in the ANPR;
- Information on any feasible means of addressing this hazard, along with the specific costs that might be involved, including information on the costs associated with the maintenance over the service life of the equipment that would likely result from potential remedies. We also request information on how effective the different remedies would be in reducing the hazard;
- Standards in Japan and some European Union countries require some gas appliances to have a means by which CO production or perhaps fuel consumption is measured. We request

information on those standards, the means by which compliance with the standards is achieved, the impact of the standards on the cost of equipment, including the maintenance costs, and the effectiveness of the standards at achieving their intended purpose;

• Any available information on the distribution of CO emissions of natural or LP gas furnaces in use, or in other words, the number of gas furnaces that are not in compliance with the 400 ppm air-free standard at any given time and the degree to which they might be producing CO in excess of that standard. We also request information on the causes of equipment producing excessive CO and their frequency of occurrence, such as improper installation, changes in installation, poor maintenance of the equipment, and so forth; and

• Any available information on the relationship between excessive CO production and fuel consumption and complete/incomplete combustion in residential furnaces and boilers that are producing excessive CO emissions may also be consuming excessive fuel or not burning fuel completely.

• Any available information on methods of alerting consumers to the need to replace sensors or combination controls that have stopped working on their furnaces or boilers (such as an alphanumeric LED trouble or error code, a flashing light, or short-cycling of the appliance).

In addition, the Commission invites interested parties to submit any existing standards, or portions of them, for consideration as a consumer product safety standard. The Commission also invites interested persons to submit a statement of intention to modify or develop a voluntary consumer product safety standard addressing the risk of injury associated with CO poisoning from residential gas furnaces and boilers, including a description of the plan to develop or modify such a standard.

Please submit comments in accordance with the instructions in the **ADDRESSES** section at the beginning of this ANPR.

Alberta E. Mills,

Secretary, U.S. Consumer Product Safety Commission.

[FR Doc. 2019–17512 Filed 8–16–19; 8:45 am]

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DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

24 CFR Part 100

[Docket No. FR–6111–P–02]

RIN 2529–AA98

HUD's Implementation of the Fair Housing Act's Disparate Impact Standard

AGENCY: Office of the Assistant Secretary for Fair Housing and Equal Opportunity, HUD.

ACTION: Proposed rule.

SUMMARY: Title VIII of the Civil Rights Act of 1968, as amended (Fair Housing Act or Act), prohibits discrimination in the sale, rental, or financing of dwellings and in other housing-related activities on the basis of race, color, religion, sex, disability, familial status, or national origin. HUD has long interpreted the Act to create liability for practices with an unjustified discriminatory effect, even if those practices were not motivated by discriminatory intent. This rule proposes to amend HUD's interpretation of the Fair Housing Act's disparate impact standard to better reflect the Supreme Court's 2015 ruling in *Texas Department of Housing and Community Affairs* v. *Inclusive Communities Project, Inc.,* and to provide clarification regarding the application of the standard to State laws governing the business of insurance. This rule follows a June 20, 2018, advance notice of proposed rulemaking, in which HUD solicited comments on the disparate impact standard set forth in HUD's 2013 final rule, including the disparate impact rule's burden-shifting approach, definitions, and causation standard, and whether it required amendment to align with the decision of the Supreme Court in *Inclusive Communities Project, Inc.*

DATES: *Comment Due Date:* October 18, 2019.

ADDRESSES: Interested persons are invited to submit comments to the Office of the General Counsel, Rules Docket Clerk, Department of Housing and Urban Development, 451 7th Street SW, Room 10276, Washington, DC 20410–0001. Communications should refer to the above docket number and title and should contain the information specified in the ''Request for Comments'' section. There are two methods for submitting public comments.

1. Submission of Comments by Mail. Comments may be submitted by mail to the Regulations Division, Office of General Counsel, Department of Housing and Urban Development, 451 7th Street SW, Room 10276, Washington, DC 20410–0500. Due to security measures at all Federal agencies, however, submission of comments by mail often results in delayed delivery. To ensure timely receipt of comments, HUD recommends that comments submitted by mail be submitted at least two weeks in advance of the public comment deadline.

2. Electronic Submission of Comments. Interested persons may submit comments electronically through the Federal eRulemaking Portal at *https://www.regulations.gov/.* HUD strongly encourages commenters to submit comments electronically. Electronic submission of comments allows the commenter maximum time to prepare and submit a comment, ensures timely receipt by HUD, and enables HUD to make comments immediately available to the public. Comments submitted electronically through the *https://www.regulations.gov/* website can be viewed by other commenters and interested members of the public. Commenters should follow instructions provided on that site to submit comments electronically.

Note: To receive consideration as public comments, comments must be submitted through one of the two methods specified above. Again, all submissions must refer to the docket number and title of the document.

No Facsimile Comments. Facsimile (fax) comments are not acceptable.

Public Inspection of Comments. All comments and communications submitted to HUD will be available for public inspection and copying between 8 a.m. and 5 p.m., weekdays, at the above address. Due to security measures at the HUD Headquarters building, an advance appointment to review the public comments must be scheduled by calling the Regulations Division at 202–708–3055 (this is not a toll-free number). Copies of all comments submitted are available for inspection and downloading at *https://www.regulations.gov/.*

FOR FURTHER INFORMATION CONTACT: David H. Enzel, Deputy Assistant Secretary for Enforcement Programs, Office of Fair Housing and Equal Opportunity, Department of Housing and Urban Development, 451 7th Street SW, Room 5204, Washington, DC 20410, telephone number 202–402–5557 (this is not a toll-free number). Individuals with hearing or speech impediments may access this number via TTY by calling the Federal Relay during working hours at 800–877–8339 (this is a toll-free number).