



U.S. CONSUMER PRODUCT SAFETY COMMISSION

WASHINGTON, D.C. 20207

Record of Commission Action
February 2, 1978

1111 18th Street, NW
Washington, DC

Presiding: Chairman Byington
Present : Commissioner Franklin
Commissioner Pittle

ITEM

Proposal to ban unvented gas-fired space heaters

(Briefing material transmitted by the Office of the
Secretary on January 18, 1978.)

DECISION

Based on the information presented in the above-referenced material, the Commission voted to propose a ban applicable to products initially introduced into commerce 30 days after publication of a final rule, and exempting infra-red heaters, catalytic and non-catalytic camp heaters and decorative gas appliances. The Commission approved the draft FR Notice with changes to reflect updated economic and injury data. The Commission further voted to establish comment period terminating the end of March and to establish a mid-March date for an oral presentation to be held in Washington, DC, if requested. Finally, the Commission voted to incorporate good cause finding and extend by 90 days the time within which to issue a final rule (150 days after publication of proposal).

VOTE

Concurring: Chairman Byington

Barbara H. Franklin
Commissioner Franklin

R. David Pittle
Commissioner Pittle

Submitted by the Office of the Secretary

and 2.2.2.3, expressed in Btu's per standard cubic foot.

$$T_{AB} = \frac{T_A + T_B}{2}$$

$$T_{CD} = \frac{T_C + T_D}{2}$$

$$E_{AB} = \frac{E_A + E_B}{2}$$

$$E_{CD} = \frac{E_C + E_D}{2}, \text{ where}$$

T_0 = 234° F. above the initial block temperature

T_A = block temperature at the end of the last "ON" period of the conventional oven before the test block reaches T_0 .

E_A = volume of gas consumed in standard cubic feet at the end of the last "ON" period before the test block reaches T_0 .

T_B = block temperature at the beginning of the "ON" period following the measurement of T_A .

E_B = volume of gas consumed in standard cubic feet of gas at the beginning of the "ON" period following the measurement of T_A .

T_C = block temperature at the end of the "ON" period which starts with T_B .

E_C = volume of gas consumed in standard cubic feet of gas at the end of the "ON" period which starts with T_B .

T_D = block temperature at the beginning of the "ON" period which follows the measurement of T_C .

E_D = volume of gas consumed in standard cubic feet of gas at the beginning of the "ON" period which follows the measurement of T_C .

4.1.2.1.2 Annual secondary cooking energy for gas ovens. Calculate the annual secondary energy consumption for cooking, E_{SO} , expressed in kilowatt-hours and defined as:

$$E_{SO} = \frac{E_{EO} \times O_o}{W_p \times C_p \times T}, \text{ where}$$

E_{EO} = electrical test energy consumption according to 3.2.1 or as calculated in 4.1.1.3.

O_o = 47.09 kWh's. annual useful cooking energy output.

W_p , C_p , and T are as defined in 4.1.2.1.1.

4.1.2.6 Total annual energy consumption of multiple conventional ovens. In the basic model of the conventional range, microwave/conventional range, or conventional oven includes more than one conventional oven, calculate the total annual energy consumption for all of the conventional ovens in the basic model, E_{TO} , expressed in kilowatt-hours per year for electrical energy and in Btu's per year for gas energy, with the following equation:

$E_{TO} = E_{ACO} + E_{ASO} + E_{TPO} + E_{SC} + E_{SS} + E_{CL}$, where gas and electrical energy are summed separately and where,

$$E_{ACO} = \frac{1}{n} \sum_{i=1}^n (E_{CO})_i$$

average annual primary energy consumption for cooking, where

n = number of conventional ovens in the basic model.

E_{CO} = annual primary energy consumption for cooking as determined in 4.1.2.1.1.

$$E_{ASO} = \frac{1}{n} \sum_{i=1}^n (E_{SO})_i$$

average annual secondary energy consumption for cooking, where

n = number of conventional ovens in the basic model.

E_{SO} = annual secondary energy consumption for cooking as determined in 4.1.2.1.2.

$$E_{TPO} = \sum_{i=1}^n (E_{PO})_i$$

total annual energy consumption, of any pilot lights, where

E_{PO} = annual energy consumption of any continuously burning pilot lights determined according to 4.1.2.2.

E_{SC} , E_{SS} , and E_{CL} are defined in 4.1.2.3.1, 4.1.2.3.2, and 4.1.2.4 respectively.

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[6355-01]

CONSUMER PRODUCT SAFETY COMMISSION

[16 CFR Part 1306]

UNVENTED GAS-FIRED SPACE HEATERS

Proposal To Ban

AGENCY: Consumer Product Safety Commission.

ACTION: Proposed rule.

SUMMARY: The Commission proposes to ban unvented gas-fired space heaters because such heaters permit combustion products, including carbon monoxide, to be discharged into the living space, and may result in possible carbon monoxide poisoning and/or asphyxiation.

DATES: (1) Written comments on the proposal must be received by the Commission by March 31, 1978.

(2) There will be an opportunity for interested persons to orally present data, views or arguments on March 6, 1978 at 10 a.m., in the Commission

hearing room. Those wishing to make oral presentations should notify the Office of the Secretary, 202-634-7700, by February 27, 1978. A summary or copy of testimony is to be submitted to the Office of the Secretary by March 1, 1978.

(3) The proposed regulation would become effective as to unvented gas-fired space heaters initially introduced into commerce 30 days after publication of any final banning rule.

(4) The time during which the Commission must either publish a final rule or withdraw this proposal is extended to July 17, 1978.

ADDRESSES: Written comments should be submitted to the Office of the Secretary, Consumer Product Safety Commission, Washington, D.C. 20207. All material which the Commission has that is relevant to this proceeding, including any comments that may be received regarding this proposal, may be seen in, and copies obtained from, the Office of the Secretary, Consumer Product Safety Commission, 3rd Floor, 1111 18th Street NW., Washington, D.C. Oral presentations will be conducted in the Commission's 3rd floor hearing room.

FOR FURTHER INFORMATION CONTACT:

George Anikis, Office of Program Management, Consumer Product Safety Commission, Washington, D.C. 20207, 301-492-6453.

Persons wishing to make oral presentations should contact: Richard Danca, Office of the Secretary, 202-634-7700.

BACKGROUND

For several years, the Commission has been examining and evaluating hazards associated with vented and unvented gas-fired heaters. By letter filed January 15, 1974, the Missouri Public Interest Research Group petitioned the Commission (CP 74-10) to initiate proceedings under the Consumer Product Safety Act (CPSA) to develop mandatory safety standards and labeling requirements for space heaters. The Commission examined the possible hazards associated with several different kinds of space heaters, including space heaters fueled by wood, kerosene, and gas, and those powered by electricity. After reviewing information then available to it, the Commission preliminarily concluded that only gas-fired space heaters presented unreasonable risks of injury to the public from such hazards as carbon monoxide poisoning and/or asphyxiation, contact burns, and fabric ignition. Therefore, on September 5, 1975 (40 FR 41172), the Commission issued a partial denial of petition CP 74-10 as to space heaters fueled by energy sources other than gas.

At that time, the Commission directed the staff to develop technical information on gas-fired space heaters for possible development of a proposed mandatory safety standard for these products. Concurrently, the Commission staff monitored the development of voluntary standards for vented gas-fired space heaters and wall furnaces by the American National Standards Institute (ANSI Z21.11.2, A21.44, and Z21.49). At a public briefing of the Commission on May 19, 1977, the staff advised the Commission that during this period, the voluntary standards for vented gas-fired heaters had been significantly improved; provisions for the safe ignition of vented heaters, reduction of surface temperatures, prevention of fabric ignition, and minimization of asphyxiation hazards, have been and are continuing to be substantially upgraded. Additionally, the Commission noted that conformance by manufacturers to the industry's voluntary standards and certification programs for vented gas-fired space heaters is high because industry certification of gas appliances to be installed in residences is widely prescribed by various state and local building codes and safety regulations. The Commission subsequently concluded that a mandatory regulation did not appear to be necessary to address any risks of injury that might be associated with vented gas-fired space heaters. A Notice of Decision to this effect was published September 14, 1977 (42 FR 46072). The Commission staff continues to monitor these voluntary efforts in order to advise the Commission on further safety developments in these voluntary standards.

The differentiating safety factor between vented and unvented gas-fired space heaters is that vented heaters provide a specific means for the removal of combustion products from the living space, whereas unvented gas-fired space heaters must depend upon the ventilation supplied to that space. Although unvented gas-fired space heaters should be operated in a space where there is sufficient ventilation, the generation of excessive levels of carbon monoxide by unvented gas-fired space heaters may occur from incomplete combustion resulting from insufficient air supply, faulty or poorly adjusted burner equipment, or other combinations of conditions.

Carbon monoxide produced by a vented gas heater will ordinarily pose a minimal threat of carbon monoxide poisoning because the combustion gases will be drafted from the living space through the flue opening. However, unvented gas-fired space heaters discharge the carbon monoxide and other combustion products directly into the atmosphere of the surrounding or adjacent living space. Carbon monoxide introduced into such a living

space by an unvented gas heater can accumulate to a hazardous concentration because the heater design inherently does not provide for venting of the combustion products to the building exterior.

The commission has previously examined the hazard of carbon monoxide poisoning from products not necessarily designed to discharge combustion products directly into the living space. On January 26, 1977 (42 FR 4882), the Commission denied petition CP 76-14 which requested the development of a safety standard to include, among other requirements, a device to shut off gas furnaces that may release CO because of malfunction. The Commission stated that "while the consequences of exposure to high levels of CO from gas furnaces are severe and occur with a frequency that is not negligible, the principal causes of dangerously high concentrations of CO from furnaces do not appear to be correctable through the issuance of a mandatory safety standard."

As stated in the Notice of Decision of September 14, 1977 (42 FR 46072), on gas-fired space heaters, the Commission publishes this proposal to ban unvented gas-fired space heaters under section 8 of the Consumer Product Safety Act (CPSA) (15 U.S.C. 2057), because the Commission believes that the public can be protected from the hazards of carbon monoxide poisoning and/or asphyxiation associated with unvented gas-fired space heaters only by removing these products from the marketplace.

MEDICAL CONSEQUENCES OF CARBON MONOXIDE POISONING

Carbon monoxide (CO) entering the human respiratory system combines reversibly with blood hemoglobin (Hb) to form carboxyhemoglobin (COHb). This reaction displaces oxygen in the blood and may lead to anoxia (reduction of oxygen in body tissues below physiologic levels) and death if the reaction is not reversed. Asphyxia brought about by CO is caused by the affinity of hemoglobin for this gas, which is 200 times as great as its affinity for oxygen; therefore, low levels of CO in the atmosphere may still result in high levels of carboxyhemoglobin in the blood. The general physiological effects of increasing atmospheric concentrations of carbon monoxide are presented in the following table:

Percent CO in atmosphere	Parts per million	Response
0.005	50	Threshold limit value, no apparent toxic symptoms.
0.01	100	No poisoning symptoms for long periods of time. Allowable for several hours.

Percent CO in atmosphere	Parts per million	Response
0.02	200	Possible headache, mild frontal in 2-3 hr.
0.04	400	Frontal headache and nausea after 1-2 hr.
0.08	800	Headache, dizziness and nausea in 45 min; collapse and possible unconsciousness in 2 hr.
0.16	1,600	Headache, dizziness, nausea in 20 min; collapse, unconsciousness, possible death in 2 hr.
0.32	3,200	Headache and dizziness in 5-10 min; unconsciousness and possible death in 10-15 min.
0.64	6,400	Headache and dizziness in 1-2 min; unconsciousness and possible death in 10-15 min.
1.28	12,800	Immediate effect, unconsciousness and danger of death in 1-3 min.

SOURCE: Industrial Toxicology, 3rd ed. Alice Hamilton, M.D. and Harriet L. Hardy, M.D. Publishing Sciences Group, 1974.

A CO concentration as little as 1/100 of the normal (21 percent) oxygen content of air may be fatal within an hour. This concentration of 0.21 percent (2,100 ppm) CO lies between the values of 0.16 percent and 0.32 percent CO reflected in the table above. Chronic CO poisoning is essentially a series of mild acute exposures and may pose a threat to the central nervous system and myocardium, the muscular substance of the heart. These tissues are very sensitive to oxygen deprivation and can show symptoms of hypoxia (deficiency in amount of oxygen reaching body tissues) either promptly after acute intoxication, or progressively after multiple exposures to carbon monoxide.

NATURE OF THE RISK OF INJURY

In assessing the nature and degree of the risk of injury associated with unvented gas-fired space heaters, the Commission was assisted by the studies referenced in the bibliography below. This literature is available for review at the Office of the Secretary.

The risks of injury associated with unvented gas-fired space heaters are threefold:

- (1) Poisoning caused by increased levels of carbon monoxide in the living space;
- (2) Asphyxiation resulting from anoxia effected by fuel combustion which reduces the oxygen level in the surrounding living space;
- (3) The combination of (1) and (2) above.

Unvented gas-fired space heaters derive their combustion air from the

space being heated and discharge the products of this combustion directly into this same space. The principle effluent products of combustion for any hydrocarbon fuel, whether solid, liquid, or gas, are carbon dioxide (CO_2), water vapor (H_2O), and a small concentration of carbon monoxide (CO). None of these products pose a threat at the concentrations given off under normal operating conditions. However, maladjustment of the burner, such as can occur by the linting of burner primary air passages, will result in the introduction of higher concentrations of CO into the living space. Additionally, the depletion of room oxygen resulting from combustion may effect a dangerous increase in CO evolution from a well adjusted burner, though the reduced oxygen level within the room may pose no threat in itself. The standard composition of air at sea level consists of 21 percent by volume oxygen (O_2). Carbon monoxide evolution in an oxygen deficient atmosphere of 19 percent O_2 can amount to 10 to 20 times the concentration produced in a normal atmosphere (21 percent O_2) with a well adjusted burner.

This latter phenomenon is of particular concern because the ventilation pattern in a room can change with the simple closing of a door, or a change in the outside wind pattern or speed. The human senses may not detect such a subtle change which can produce a dangerous reduction in the room air exchange rate.

DEGREE OF RISK OF INJURY

Data on unvented gas-fired space heater-related injuries and deaths occurring in the United States have been compiled using the best data bases currently available. The hazard patterns associated with unvented gas-fired space heaters have been identified as burns resulting from contact with heater exteriors and clothing ignition, and carbon monoxide poisoning and/or asphyxiation. This proposed ban addresses only the risk of injury associated with CO poisoning and/or asphyxiation.

The Commission's data sources for product-related injuries stem from the National Electronic Injury Surveillance System (NEISS) of 119 hospital emergency rooms and the coding scheme developed for NEISS. NEISS does not have a product code for unvented gas-fired space heaters specifically; therefore, the Commission staff tabulated data from the following four codes that could include unvented gas-fired space heaters:

- 0325 Heating Stoves, Space Heaters, Gas, LP.
- 0350 Heaters, Room, Gas, Floor type.
- 0352 Heaters, Wall, Gas.
- 0353 Space Heaters, Gas not otherwise specified.

Using these product codes, it is not possible to determine the proportion of the NEISS estimated injuries associated only with unvented gas-fired space heaters. Ninety-four percent of all gas-fired space heater-related injuries contained in NEISS are recorded as burns or other epidermal injuries. Fatalities associated with unvented gas-fired space heaters which may have resulted from CO poisoning and/or asphyxiation may not be taken to an emergency room and, therefore, would not be represented in NEISS.

In a review of the in-depth investigations and death certificates, all NEISS product codes which conceivably could contain any cases concerning the unvented gas-fired appliances defined in the proposed ban were reviewed.

Of 111 unvented gas-fired space heater investigations received between April 1968 and December 1977, six cases involving carbon monoxide poisoning were identified; 3 such cases resulted in asphyxiation and death.

The Commission's computerized Death Certificate file reflects 504 deaths during the period from January 1973 through January 1978 in which it could be ascertained that a gas-fired space heater was involved; 256 of these deaths resulted from carbon monoxide poisoning and/or asphyxiation. In 65 of these deaths the gas-fired space heater was identified as unvented. A percentage of the remaining deaths also resulted from unvented gas-fired space heaters; however, because of the limited information provided by these death certificates, the exact number of deaths resulting from unvented gas-fired space heaters cannot be determined. Therefore, the 65 carbon monoxide poisoning/asphyxiation deaths positively linked to unvented gas-fired space heaters must be considered as a minimum value.

The Death Certificate Project is designed to include death certificates from 54 health jurisdictions which include the 50 states, as well as New York City, the District of Columbia, Puerto Rico, and the Virgin Islands.

Data collected through the Commission's computerized Death Certificate project are a minimum and are not indicative of the true total of product-related deaths for the following reasons:

- (1) Not all Death Certificates identify the products and, therefore, are not included in the true count.
- (2) There are gaps in the data base in prior years for certain health jurisdictions due to non-participation.
- (3) There are also those health jurisdictions which delay submitting reports which often reduces the true number of Death Certificates obtained for any recent time period.

The Commission reviewed data on gas-fired space heaters from the National Fire Prevention and Control Administration. No data relevant to injuries/deaths from carbon monoxide

poisonings and/or asphyxiation related to gas space heaters were found.

Although the magnitude of the injury and death problem associated with unvented gas-fired space heaters cannot be precisely determined from the available data, the potential for such injuries or deaths, particularly those arising from carbon monoxide poisoning and/or asphyxiation, is substantial because such heaters discharge their combustion products directly into the living space.

DESCRIPTION OF THE PROPOSED BAN

Proposed Part 1306 declares that unvented gas-fired space heaters, as defined in §1306.3, are banned hazardous products under section 8 of the CPSA. The proposed ban applies to products that are customarily produced or distributed for sale to or for the personal use, consumption or enjoyment of consumers in or around a household or residence, a school, in recreation or otherwise and that are initially introduced into commerce 30 days after the effective date of the ban. For purposes of this Part 1306, "initially introduced into commerce" means physically shipped from the domestic manufacturer's facilities to a distributor, retailer, or consumer. A product manufactured outside the United States is initially introduced into commerce when it is first brought within a U.S. port of entry.

For the purposes of this proposal, an unvented gas-fired space heater in an unvented, self-contained, free-standing or recessed, gas-burning appliance which furnishes warm air to the surrounding living space by gravity convection, fan circulation or radiation directly from the heater and without duct connections. The heater discharges carbon dioxide and water vapor, and any carbon monoxide in the combustion products directly into the heated space. Although kitchen ranges and ovens may fit this product description, they are not included within this definition because their function is not to provide room heat, but to serve as a source of localized heat for food preparation.

Within the scope of this definition, unvented gas-fired space heaters include unvented circulators; radiant heaters; and wall heaters, unvented closed front; as defined in the following paragraphs:

(1) "Unvented Circulator." A room heater designed to convert the energy in the fuel to convected and radiant heat by direct mixing of air to be heated with the combustion products and excess air inside the jacket. Unvented circulators have an external jacket surrounding the burner and may be equipped with radiants with the jacket open in front of the radiants.

(2) "Radiant Heaters." An open-front unvented room heater designed

primarily to convert the energy in the fuel to radiant heat by means of re-radiating radiants or similar radiating materials. A radiant heater has no external jacket.

(3) "Wall Heater, Unvented Closed Front." An unvented circulator having a closed front for insertion in or attachment to a wall or partition.

The following unvented heaters are exempt from the proposed ban for the reasons set forth below: Gas logs, coal baskets, fireplace inserts, (categorized as decorative gas appliances for purposes of this rule); portable catalytic camp heaters; portable camp heaters other than catalytic; and infrared heaters.

(1) "Decorative gas appliances" are exempt. These are gas logs, coal baskets, and fireplace inserts. Although such items could possibly serve as substitutes for the banned hazardous products, they are exempt from the ban for the following reasons:

(a) An investigation of available data bases for product-related injuries/deaths revealed no data specific to these products. Although the magnitude of the injury/death problem associated with these decorative gas appliances cannot be accurately determined, it appears to the Commission that consumer use of these appliances is primarily limited to decorative use in vented fireplaces where the risk of CO poisoning and/or asphyxiation is minimal.

(b) The American National Standards Institute (ANSI), a voluntary standards organization, has published a certification standard and labeling requirement for decorative gas appliances for installation in vented fireplaces (ANSI-Z21.60). The large majority of such decorative gas appliances are labeled for use in a vented fireplace.

(c) The likelihood of substantial substitution from unvented gas-fired space heaters to decorative gas-fired appliances, the most predominant of which are gas logs, appears small. This judgment is based upon the steadily declining market for these products over the past several years—approximately 20,000 units were produced in 1976 compared to approximately 12,000 units in 1974, and the familiarity of potential users with vented gas-fired space heaters as a likely substitute for the banned product.

(2) Catalytic camp heaters and non-catalytic camp heaters are exempt.

(a) Catalytic camp heaters are open faced, unvented heating appliances which utilize a catalyst in the combustion process. The Commission has recently denied a petition, (CP 75-16, 42 FR 32565, June 27, 1977), to develop a safety standard addressing the hazards of CO poisoning, anoxia and hot surfaces associated with catalytic heaters because, among other consid-

erations, the voluntary standard developed by the ANSI Z21.62 Subcommittee, and recently adopted by ANSI, appears to reasonably address the possible hazards which may be associated with catalytic heaters. Therefore, the Commission sees no need to include these in the proposed ban.

(b) Non-catalytic camp heaters are unvented portable heating devices of other than the catalytic type for use with liquified petroleum gases. Because the safety problems inherent to these heaters are essentially the same as the safety problems encountered with catalytic heaters, the ANSI Z21.63 Subcommittee has developed and presented to ANSI for adoption a proposed voluntary standard for non-catalytic camp heaters which closely parallels the catalytic heater standard. Therefore, the Commission proposes to exclude non-catalytic camp heaters from this ban.

(3) Infrared heaters are exempt because they are generally used for heating outdoor spaces or non-residential, non-recreational indoor spaces; such applications do not relate to situations involving the CO poisoning and/or asphyxiation hazard of unvented gas-fired space heaters normally encountered in consumer environments.

The Commission welcomes public comment on the inclusions and exemptions defined within the scope of the proposed ban.

ECONOMIC CONSIDERATIONS

Shipments of unvented gas-fired space heaters have declined dramatically during the past decade—to a level of 180,000 units in 1976—a 70 percent decline since 1967. The number of manufacturers has similarly decreased through this same decade and currently numbers three. Sales of unvented gas-fired space heaters accounted for less than one third of the total sales volume for all three manufacturers. These three firms produce a variety of gas-fired equipment, including vented heaters which are expected to be the major substitute product for unvented gas-fired space heaters. Therefore, a ban on unvented gas-fired space heaters would not cause serious adverse financial impact on the three manufacturers. Assuming these manufacturers are producing vented gas heaters at less than full capacity, substitution to these vented products would entail little or no additional cost to the manufacturers. Conversion to other products could, however, be time consuming and costly to the industry. Approximately \$1.5 million in machinery and tooling for unvented heaters could be lost.

A ban on unvented gas-fired space heaters would affect distributors only if additional product lines could not be substituted. This is not expected; for the large majority of retailers who

carry unvented gas-fired space heaters, these heaters are not a significant share of their business.

Primary users of unvented gas-fired space heaters tend to be elderly and low-income persons in southern areas of the United States where climatic conditions make central heating systems uneconomical for many households. Unvented gas-fired space heaters are selected primarily because of their low initial purchase price.

Historically, unvented gas space heaters have been one of the most inexpensive non-central heating appliances on the market. However, recent voluntary industry safety standards (Z21.11.2) have increased the price of unvented models as to minimize the competitive advantage they have over vented heaters in terms of purchase price. Current gas space heater retail prices for both vented and unvented models are approximately \$140 for medium-sized, 25,000 BTU heaters. Unvented gas-fired space heaters have a thermal efficiency approaching 100 percent since none of the heat energy generated is exhausted through a flue opening. Conversely, vented gas-fired space heaters have standard efficiency ratings of 65-70 percent and are, therefore, more expensive to operate. A switch from a 25,000 BTU unvented heater to an equivalent vented heater could have a projected increased operating cost of \$25-36 annually, at current fuel prices. Therefore, the adverse impacts to the consumer resulting from a ban on unvented gas-fired space heaters include modest increases in price of initial purchase, increases in cost of operation, or decreases in residential heating capabilities in cases in which substitution or replacement of heating equipment is unaffordable.

It is estimated that the most likely substitutes for unvented gas-fired space heaters are:

- (1) Vented gas-fired space heaters—45 percent of a substitute market
- (2) Electric portable heaters—25 percent of a substitute market
- (3) Other vented non-central heaters—20 percent of a substitute market
- (4) Other heater systems—10 percent of a substitute market

The cost of residential non-central space heating has been rising rapidly over the past few years. Factors in this increase in cost include rising fuel costs and stricter industry safety standards on new equipment. A ban on unvented gas-fired space heaters would contribute to the rising costs of non-central space heat by forcing consumers to switch to heaters which have higher life-cycle heating costs. The accumulated impacts of rising heating costs and a ban on unvented gas-fired space heaters are expected to place the life-cycle costs of non-central space heat beyond the expectation and perhaps ability to pay for some consumers.

The Gas Appliance Manufacturers Association (GAMA), through a survey of affiliated firms, has estimated that approximately 90 production workers could suffer unemployment because of a ban on unvented gas-fired space heaters. However, the three manufacturing firms are located in urban areas where long-term unemployment resulting from a ban would not be expected to be significant.

A ban on unvented gas-fired space heaters is expected to reduce the risks of carbon monoxide poisoning and/or asphyxiation since most substitute products appear to offer significantly reduced risks of CO poisoning and/or asphyxiation.

The Commission staff economic analysis and all supporting materials are available from the Office of the Secretary.

ENVIRONMENTAL CONSIDERATIONS

An environmental assessment of the alternatives associated with a possible ban on unvented gas-fired space heaters addressing the potential effects of actions on consumer safety, energy use, technological innovation, and the physical environment, has been conducted. The assessment concludes that a ban on unvented gas-fired space heaters would not have a significant adverse effect on the quality of the human environment and that an Environmental Impact Statement is not required.

It is estimated that the annual increase in energy consumption brought about by substitution to less efficient forms of space heat than unvented gas-fired heaters would be approximately 5.4 trillion British Thermal Units (BTU). The cumulative increase in energy usage projected by a ban on unvented gas-fired space heaters would reach a maximum value of approximately 0.1085 quads, or 1.085×10^{14} BTU, of energy by 1997. This figure may be compared to a Federal Energy Administration (FEA) projected total energy consumption of 98.9 quads for the United States in 1985. The maximum cumulative increase in energy consumption projected by a ban on unvented gas-fired space heaters is not large and may not occur with changes in demand for this product or changes in technology.

EFFECTIVE DATE

The proposed effective date of the ban is 30 days after publication of a final rule.

The Commission proposes that this rule will apply to the defined products initially introduced into commerce on or after the effective date of the ban. For purposes of this Part 1306, the term "initially introduced into commerce" means when the product is physically shipped or delivered from the domestic manufacturer's facilities

to a wholesaler, distributor, retailer or consumer. A product manufactured outside the United States is initially introduced into commerce when it is first brought within a U.S. port of entry. The sale of products that had been shipped or delivered to a wholesaler, distributor, retailer or consumer prior to the effective date of the ban would not be prohibited.

The prevailing practice of the gas-fired space heater industry is that manufacturers obtain order commitments from distributors during the first calendar quarter, and manufacture and deliver during the second and third calendar quarters. A proposed ban on the initial introduction into commerce, published near the end of the first calendar quarter, may discourage the acceptance of 1978 orders, as well as the future manufacture of unvented gas-fired heaters, and may serve to mitigate possible disruption of the industry. A ban that applies to initial introduction into commerce would permit depletion of existing inventories at the wholesale and retail levels; however, due to the seasonal nature of the demand for these products, it is anticipated that inventory levels would be low at the end of the first calendar quarter.

By the next consumer buying season in the fall of 1978, it is expected that the product proposed to be banned would be prohibited from initial introduction into commerce. A ban sufficiently in advance of the fall buying season will permit consumers time to consider the relative merits of various substitute heating products.

SECTION 8 FINDINGS

Section 8 of the CPSA requires that, in order to propose a ban, the Commission must find that a consumer product is being or will be distributed in commerce, that it presents an unreasonable risk of injury and that no feasible consumer product safety standard under the CPSA would adequately protect the public from that unreasonable risk.

A. *Unreasonable risk of injury.* The term "unreasonable risk of injury" is not defined in the CPSA; however, the term "risk of injury" is defined at section 3(a)(3) to mean a risk of death, personal injury, or serious or frequent illness. The legislative history of the CPSA (H.R. Rep. No. 92-1153, 92d Cong., 2d Sess., 1972, p. 33) states that determination of unreasonable hazard (risks) involves balancing the probability that risk will result in harm and the gravity of such harm against the effect of regulation on the product's utility, cost, and availability to the consumer.

The matter of distribution in commerce of unvented gas-fired space heaters is discussed under economic considerations. Although shipments of

this product decline 70 percent in the decade since 1967, it is noted that 180,000 units were shipped in 1976. Further, although it is expected that this decline would continue, it is anticipated that the manufacture and distribution of these products would also continue without Commission action to ban.

The hazard of CO is illustrated in the chart included in the discussion of medical consequences of carbon monoxide poisoning and indicates that a CO concentration of as little as $\frac{1}{1000}$ of the normal (21 percent) oxygen content, may be fatal within an hour. The discussion under nature of the risk of injury and degree of the risk of injury show that maladjustment of the burners of unvented heaters or shifts in room ventilation patterns may act to introduce high concentrations of CO into the living space. Further, a review of death certificates shows that 65 deaths were positively associated with unvented gas-fired space heaters, and were attributed to CO poisoning and/or asphyxiation.

The Commission considered the effect on the cost, utility, and availability of unvented, gas-fired space heaters, and except for the exemptions noted in section 1306.4 of the rule, it is noted that this rule would eliminate the product from the market. However, the Commission also noted, as is discussed under Economic Considerations, that there are substitute heating appliances available to the public.

After considering the nature and degree of this hazard, of which people are generally unaware, and the ready availability of substitutes, the Commission concludes that the risk of injury clearly outweighs the effect of the proposed rule on the cost, utility, and availability of the product, and finds that unvented gas-fired space heaters present an unreasonable risk of injury to the public.

B. *Feasibility of a standard.* The Commission has considered all the information currently available to it concerning the risk of injury associated with unvented gas-fired space heaters because of CO poisoning and/or asphyxiation. It appears to the Commission that this hazard is inherent in the product, because unvented heaters are designed to discharge all combustion products, including carbon monoxide directly into the living space and because carbon monoxide may be emitted whether or not the heater is functioning properly. Additionally, because CO is a colorless, odorless gas, people are generally unaware of CO emissions, particularly if it is emitted during sleeping hours. Therefore, the Commission concludes that unvented gas-fired space heaters present an unreasonable risk of injury.

In seeking to reduce or eliminate this unreasonable risk, the Commis-

tion reviewed the provisions of existing voluntary standards. Additionally, the Commission considered the technical and economic practicability of a mandatory safety standard to reduce or eliminate the unreasonable risk.

Voluntary standards. Two American National Standards Institute (ANSI) voluntary standards were reviewed and evaluated:

- (1) ANSI Z21.60 Decorative Gas Appliances for Installation in Vented Fireplaces.
- (2) ANSI Z21.11.2 Gas-Fired Room Heaters, Vol. II, Unvented Room Heaters.

Both the ANSI Z21.60 and ANSI Z21.11.2 standard contain provisions or:

(a) Combustion tests and specific limits on production of CO under normal oxygen supply conditions and conditions of reduced oxygen supply.

(b) Labels warning of ventilation requirements.

(c) Printed instructions regarding combustion and ventilation requirements to be included with the sale of the individual appliance.

The ANSI Z21.11.2 standard also addresses optional oxygen depletion systems (ODS). If heaters covered by this standard have ODS, they are required to shut off the heater at oxygen levels of not less than 18%.

Additionally, a proposed revision of the ANSI Z21.11.2 standard pending ANSI approval, contains provisions for a temperature limiting device which will function to shut down the heater if the room temperature exceeds 100°. This is intended to minimize further the potential build-up of carbon monoxide in the room due to reduced availability of combustion air. It is indicated upon the premise that, as

combustion air availability decreases due to inadequate air infiltration into the room in which the heater is operating, room temperature will increase.

No provisions within either of these standards directly address the hazard of carbon monoxide in the living space. Consequently, it does not appear to the Commission that any voluntary standard exists which could address the hazard of CO poisoning associated with unvented gas-fired space heaters.

Engineering feasibility of a mandatory standard. The possibility of requiring CO detection and gas cut-off devices in a standard has been considered. The Commission has no knowledge of any unvented gas-fired space heaters with carbon monoxide detection and gas-ignition cut-off devices currently being manufactured. Two National Bureau of Standards (NBS) reports, prepared for the Commission, reviewed and evaluated six possible types of sensors.

Additionally, a review of the technology of such devices was performed (Economic Impact of Ban on Unvented Gas-Fired Space Heaters—Preliminary Report, A. T. Kearney, Inc., September 1977). These reports and associated materials are available at the Office of the Secretary. The reports conclude that the majority of the current technologies available are technically impractical for application to unvented gas-fired space heaters due to short useful life, unacceptable levels of CO detection, unreliable performance, or excessive cost. Table 1 of the Kearney report, summarizes the various findings.

Economic feasibility of a standard. The maximum feasible price increase for unvented gas-fired space heaters that would be economically practicable was estimated by calculating the price consumers might be willing to spend initially to obtain the high efficiency of an unvented gas-fired space heater rather than turning to substitute products. The maximum economically feasible increase is approximately \$110 a unit. This figure reflects, among other things, such factors as the product's purchase price, installation cost, thermal efficiency, and annual fuel costs.

A reliable carbon monoxide control device currently costs a minimum of \$900. The semi-conductor absorption type detector at its present state of development is less expensive, \$43-100, but subject to substantial error and is unreliable at CO concentrations below 100 ppm. It appears to the Commission, therefore, that current technology for adequately addressing the CO poisoning and/or asphyxiation hazard is economically unfeasible.

Lack of feasibility of a standard. The Commission concludes, based upon the information discussed in the foregoing sections under Feasibility of a Standard, that, at the present time, no feasible consumer product safety standard can make unvented gas-fired space heaters nonhazardous. Furthermore, given the current state of technology of CO detection and cut-off devices, it does not appear that a standard is economically practicable. Therefore, the Commission believes that no feasible consumer product safety standard under the CPSA can adequately protect the public from the hazard of CO poisoning and/or asphyxiation associated with this product.

TECHNOLOGIES APPLICABLE TO A PRODUCT SAFETY STANDARD FOR UNVENTED GAS-FIRED SPACE HEATERS

Device	Cost per unit	Technology	Remarks
Oxygen Depletion Sensor (ODS).	NA	Automatic shutoff at given level of O ₂ depletion.	Not readily available in U.S.
Electro-chemical CO detector.	\$900	CO detection by electrochemical oxidation.	Not reliable for natural gas. Performs well, CO from 0-60 p/m can be detected with a CO sensitivity of 1 p/m or better.
Solid-state catalytic detector	NA	Utilizes modern circuit and semiconductor technology.	3 to 5 year service life. CO detection at 150 p/m.
Semiconductor absorption-type detector.	\$43-\$100	do	Unstable and unreliable in range below 100 p/m CO. Requires electricity. Further developmental study and evaluation necessary.
Solid-state electrolytic cell gas sensor.	\$1,000	do	Accurate, long lasting.
Diffuse infrared gas analyzer (NDIR).	\$3,000	Utilizes infrared radiation produced from heater elements.	Accurate, reliable.

Sources: National Bureau of Standards, "Evaluation of Protective Device on Catalytic Heaters" (March 7, 1977). National Bureau of Standards, "Detection Devices for Combustion Products Applicable to Unvented Space Heaters" (July, 1977). Interviews with Kang B. Lee, National Bureau of Standards.

EXTENSION OF TIME TO PUBLISH FINAL RULE

Section 9(a)(2) of the CPSA (15 U.S.C. 2058(a)(2)) requires the Commission to publish a notice of proposed rulemaking in the FEDERAL REGISTER and to provide interested persons with an opportunity to participate in the rulemaking through submission of written data, views, or arguments. In addition to these written comments, interested persons must also be given an opportunity for the oral presentation of data, views, or arguments.

Section 9(a)(1) of the CPSA provides that within 60 days after publication of a proposed rule, the Commission shall promulgate a final rule or withdraw the proposal. The Commission may extend the 60-day period for good cause and must publish its reasons for extension in the FEDERAL REGISTER.

In the case of invented gas-fired space heaters, the Commission is par-

ticularly interested in obtaining views on the possible effects of the ban from persons who use these products or are familiar with their use. To afford ample opportunity for obtaining such views, the Commission has decided that, in addition to holding a public meeting in Washington, D.C., on March 6, 1978, the comment period in which the public is invited to submit written comments on the proposed ban, is to be longer than the 30-day period usually provided. Written comments may be submitted for 45 days until March 31, 1978. In addition, the Commission has directed its staff to determine whether a public meeting, with an opportunity for oral presentations, in the south or southwest United States, where use of the product is most prevalent, would encourage participation of persons who use unvented gas-fired space heaters. Announcement of such a public meeting if it is held, will be published in the **FEDERAL REGISTER**.

It is anticipated that these additional steps to obtain greater public participation in these rulemaking proceedings, and the need for analysis, and evaluation of the public's oral and written views, would require more than the 60-day period provided in section 9(a) of the CPSA between publication of a proposal and publication of any final rule. Therefore the Commission has decided that this 60-day time period should be extended. In order to conserve the resources that would be needed to issue such an extension of time during the comment and evaluation period, the Commission announces in this proposal that good cause is found to extend for 90 days, until July 17, 1978, the time in which the Commission must either issue a final rule concerning unvented gas-fired space heaters or withdraw the proposal to ban. This period may be further extended for good cause and announced in the **FEDERAL REGISTER**.

CONCLUSION AND PROPOSAL

Based on the foregoing information, the Commission finds that unvented gas-fired space heaters are being and will be distributed in commerce; that they present an unreasonable risk of injury to the public, and that no feasible consumer product safety standard under the CPSA can adequately protect the public from that risk of injury. Therefore, the Commission proposes to declare that these products are banned hazardous products.

Accordingly, pursuant to provisions of the CPSA (section 8, 9, 86 Stat. 1215-17, 15 U.S.C. 2057, 2058) the Commission proposes that Title 16, Chapter II, be amended by adding to Subchapter B, the following new Part 1306.

PART 1306—BAN OF UNVENTED GAS-FIRED SPACE HEATERS

Sec.

1306.1 Scope and application.

1306.2 Purpose.

1306.3 Definitions.

1306.4 Exemptions.

1306.5 Banned hazardous products.

AUTHORITY: Sections 8, 9, 96 Stat. 1215-1217, as amended, 90 Stat. 506; 15 U.S.C. 2057, 2058.

§ 1306.1 Scope and application.

(a) The Consumer Product Safety Commission declares that unvented gas-fired space heaters are banned hazardous products. This ban applies to the products listed in § 1306.3(c) (1) through (3), which are customarily produced or distributed for sale to or for the use, consumption, or enjoyment of consumers in or around a household, a school, in recreation or otherwise.

(b) The Commission has found that: (1) the unvented gas-fired space heaters described herein are being or will be distributed in commerce; (2) they present an unreasonable risk of injury because they are designed to discharge the combustion products, including carbon monoxide (CO) directly into the living space and people are generally unaware of the danger; and (3) no feasible consumer product safety standard under the CPSA can adequately protect the public from the hazard of CO poisoning. The proposed ban applies to all unvented heaters described in this Part which are initially introduced into commerce on or after the effective date of the ban.

§ 1306.2 Purpose.

This rule declares that unvented gas-fired space heaters are banned hazardous products because they present an unreasonable risk of injury due to: (a) carbon monoxide poisoning, (b) asphyxiation resulting from anoxia (reduction of oxygen in body tissues below physiologic levels) caused by fuel combustion that reduces existing oxygen levels in the living space, and (c) the combination of (a) and (b).

§ 1306.3 Definitions.

(a) The definitions in section 3 of the Consumer Product Safety Act (15 U.S.C. 2052) apply to this Part 1306.

(b) "Initially introduced into commerce" means that the product is physically shipped or delivered from the domestic manufacturer's facilities to a distributor, retailer or consumer. A product manufactured outside the United States is initially introduced into commerce when it is first brought within a U.S. port of entry.

(c) "Unvented Gas-Fired Space Heaters" are unvented, self-contained, free-standing or recessed, gas-burning

appliances, such as those described in this subsection, which furnish warm air to the surrounding or adjacent living space by gravity convection, fan circulation or radiation directly from the heater and without duct connections, and which discharge combustion products such as carbon monoxide, carbon dioxide, and water vapor directly into the heated space. Not included in this definition are kitchen ranges and ovens since the function of such products is not to provide a source of room heat, but rather to provide a source of localized heat for food preparation. The term "unvented gas-fired space heater" includes but is not limited to:

(1) "Unvented Circulator." This product is a room heater designed to convert the energy in the fuel to convected and radiant heat by direct mixing of air to be heated with the combustion products and excess air inside the jacket. Unvented circulators have an external jacket surrounding the burner and may be equipped with radiants with the jacket open in front of the radiants.

(2) "Wall Heater, Unvented Closed Front." This product is an unvented circulator having a closed front for insertion in or attachment to a wall or partition.

(3) "Radiant Heater." This product is an open-front unvented room heater designed primarily to convert the energy in the fuel to radiant heat by means of refractory radiants or similar radiating materials. A radiant heater has no external jacket.

§ 1306.4 Exemptions.

The following categories of products are exempt from the ban:

(a) *Decorative gas appliances.* Such appliances, generally used for decorative purposes in vented fireplaces to simulate natural materials such as wood and coal, are "gas logs," "coal baskets," and "fireplace inserts."

(b) *Catalytic camp heaters.* An existing voluntary standard is expected to adequately address whatever risks may be present during use of this product.

(c) *Non-catalytic camp heaters.* A voluntary standard is expected to adequately address whatever hazards may be present when using the product.

(d) *Infrared heaters.* Such heaters are generally used for heating outdoor spaces or for indoor, non-consumer environments.

§ 1306.5 Banned hazardous products.

Any unvented gas-fired space heater, not specifically exempted in § 1306.4, that is produced or distributed for sale to or for the personal use, consumption, or enjoyment of consumers, in or

PROPOSED RULES

around a permanent or temporary household or residence, a school, in recreation, or otherwise, which is initially introduced into commerce 30 days after publication of any final banning rule, is a banned hazardous product. Section 9(c) of the CPSA (15 U.S.C. 2058(c)) requires the Commission, prior to issuing a consumer product safety rule to consider and make certain findings for inclusion in the rule. As discussed in the preamble to this proposed rule, information set forth in the Bibliography, which is available in the Office of the Secretary, has enabled the Commission to draw preliminary conclusions relative to these findings. To further help the Commission in this effort, the Commission is particularly interested in obtaining, either by written comment or by oral presentations, additional data, views, and arguments on the following matters:

(a) The degree and nature of the risk of injury the rule is designed to eliminate or reduce;

(b) The approximate number of consumer products, or types or classes thereof, subject to the rule;

(c) The need of the public for consumer products subject to such rule, and the probable effect of such a rule upon the utility, cost, or availability of such products to meet that need;

(d) Any means of achieving the objective of the rule while minimizing adverse effects on competition or disruption or dislocation of manufacturing and other commercial practices consistent with the public health and safety;

(e) The necessity of the rule to eliminate or reduce the unreasonable risk of injury associated with the consumer products subject to the rule;

(f) Whether the rule is in the public interest;

(g) The feasibility of a consumer product safety standard under the CPSA to protect the public adequately from the unreasonable risk of injury associated with the products which are the subject of this proposed ban;

(h) The potential environmental effects of the rule;

(i) Any adverse effects that this proposed ban will have on elderly and handicapped persons.

There will be an opportunity for interested persons to orally present data, views, or arguments on this proposed rule on March 6, 1978, at 10 a.m., in the Commission hearing room, 3rd floor, 1111 18th Street, NW., Washington, D.C. Those wishing to make oral presentations should notify the Office of the Secretary, 202-634-7700 by February 27, 1978. In addition, a summary or copy of the testimony, preferably in 5 copies, is to be submitted to the Office of the Secretary by March 1, 1978.

Interested persons are invited to submit written data, views, or arguments on any aspect of the proposed rule by March 31, 1978, preferably in 5 copies, addressed to the Secretary,

Consumer Product Safety Commission, Washington, D.C. 20207.

The official transcript of the public meeting to hear oral presentations of data, views, or arguments, any written comments that are received, and all other material which the Commission has that is relevant to this proceeding may be seen in, or copies obtained from the Office of the Secretary, 3d floor, 1111 18th Street NW., Washington, D.C. 20207.

Dated: February 8, 1978.

SHELDON D. BUTTS,
Assistant Secretary, Consumer
Product Safety Commission.

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- [FR Doc. 78-3949 Filed 2-13-78; 8:45 am]

[4110-03]

DEPARTMENT OF HEALTH,
EDUCATION, AND WELFARE

Food and Drug Administration

[21 CFR Parts 182, 184]

[Docket No. 77N-00411]

STANNOUS CHLORIDE

Proposed Affirmation of GRAS Status as Direct Human Food Ingredient

AGENCY: Food and Drug Administration.

ACTION: Proposed rule.

SUMMARY: This is a proposal to affirm the generally recognized as safe (GRAS) status of stannous chloride as a direct human food ingredient. The safety of this ingredient has been evaluated pursuant to the comprehensive safety review being conducted by the agency. This proposal would list the ingredient as a direct food substance affirmed as GRAS.

DATES: Written comments by April 17, 1978.

ADDRESSES: Written comments to Hearing Clerk (HFC-20), Food and Drug Administration, Room 4-65, 5600 Fishers Lane, Rockville, Md. 20857.

FOR FURTHER INFORMATION
CONTACT:

Corbin Miles, Bureau of Foods (HFF-335), Food and Drug Administration, Department of Health, Education, and Welfare, 200 C Street SW., Washington, D.C. 20204, 202-472-4750.

SUPPLEMENTARY INFORMATION:

The Food and Drug Administration is conducting a comprehensive safety review of direct and indirect human food ingredients classified as generally recognized as safe (GRAS) or subject to a prior sanction. The Commissioner has issued several notices and proposed regulations, published in the FEDERAL REGISTER of July 26, 1973 (38 FR 20040), initiating this review. Pursuant to this review, the safety of stannous chloride has been evaluated. In accordance with the provisions of § 170.35 (formerly § 121.40, prior to recodification published in the FEDERAL REGISTER of March 15, 1977 (42 FR 14302)), the Commissioner proposes to affirm the GRAS status of this ingredient.

Stannous chloride is the chloride salt of tin metal, SnCl_2 . It is listed in § 182.3845 (formerly § 121.101(d)(2), prior to recodification published in the FEDERAL REGISTER of March 15, 1977 (42 FR 14302)), as GRAS for use as a chemical preservative in foods at a level not to exceed 0.0015 percent calculated as tin, published in the FEDERAL REGISTER of November 20, 1959 (24 FR 9369), and subsequently recodified.