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~~RESTRICTED~~

TWO WAHRENBERGER HOUSE  
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AUSTIN, TEXAS 78701

TWO ENERGY SQUARE  
4849 GREENVILLE AVENUE  
DALLAS, TEXAS 75206

TELEX 73-2298 · TELECOPY (214) 969-1751

DIRECT DIAL:  
(214) 969-1102

June 27, 1984

MFR/PRVLR NOTIFIED  
 No Comments made  
 Comments attached  
 Excisions/Revisions  
 Firm has not requested  
further notice  
*Jun 6/4/88*

Compliance Division  
United States Consumer Product Safety Commission  
5401 Westbard Avenue  
Bethesda, Maryland 20207

Gentlemen:

At the request of John Norris, Jr., President of Lennox Industries Inc. ("Lennox"), I am submitting this report describing incidents in which the exhaust vents on 19 of some 65,000 Lennox Pulse furnaces froze partially shut during December 1983 permitting exhaust gases to be briefly vented into the buildings where installed before shutting off. These isolated incidences occurred during a period of unprecedented low temperatures and high winds resulting in widespread freezing of water pipes and even plumbing vents.

It was the position of Lennox at the time these incidents were brought to the attention of an officer or employee capable of appreciating the significance of the information, and it continues to be the position of Lennox, that these incidents do not establish the existence of a substantial product hazard, as defined in Section 15 of the Consumer Product Safety Act, with respect to the Pulse furnace.

However, the Consumer Product Safety Commission's ("Commission") latest pronouncement on the circumstances in which reports of potential substantial product hazards should be filed, indicates this matter should be brought to the attention of the Commission. See 49 Fed. Reg. 13820 (1984). Lennox does not believe this latest policy statement correctly restates the law. Nevertheless, as it constitutes the Commission's current position, in an attempt to deal with the Commission in the non-adversarial manner described in that statement, the following information is provided.

BACKGROUND

The products involved in the incidents were Lennox furnace models G14Q3-40, G14Q30-60/80 and G14Q3-100, referred to as Pulse

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model furnaces. Lennox Pulse model furnaces are manufactured by Lennox Industries Inc. in Marshalltown, Iowa and Toronto, Ontario. The G14 furnace operates on a principle of pulse combustion. Small quantities of gas (1/4-1/2 Btu) and air are ignited at a rate of 60 to 70 times per second. A condensing heat exchanger extracts 200°-350°F more heat from the flue gas than does a conventional furnace. The results are up to 97% efficiency and flue temperatures as low as 100°F.

#### THE PROBLEM

In December 1983 and January 1984 different field representatives of Lennox received reports that exhaust vents had frozen partially shut on a number of Pulse furnaces. Attached is a listing of the model involved, the serial number of the particular unit, the approximate date the unit was manufactured, the approximate date of the incident, and the location of the residence.

A review of available information establishes the exhaust vents that became partially frozen shut passed through unheated areas of the residences before exiting, and were not insulated. Moreover, all but two of the incidents occurred during the period December 17 through December 27, 1983. A review of National Weather Service data for the areas where the incidents occurred during the period in question establishes the average daily temperature was -2°F and the average wind speed was 13 m.p.h. Moreover, during the period December 22 through December 25, 1984, temperatures of -20°F to -30°F and wind speeds of up to 40 m.p.h. were common in the areas where problems were reported. These areas also reported frozen water pipes, frozen plumbing vents and verbal reports of frozen vents on standard furnaces due to unusually cold weather. These Weather Service reports further established these conditions set all time records.

The combination of the weather, the manner in which the exhaust vents were installed, and the lower temperature of the exhaust gas in the Pulse furnace led to these exhaust vents becoming partially frozen shut. The Pulse furnace will not start if the exhaust flue is completely restricted. However,

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~~REJECTED~~

if the flue is slowly restricted during operation (i.e., gradual ice buildup), the furnace may continue to operate for a period of time. Under these operating conditions, some of the flue products can be forced out the condensate drain. It should be noted that no similar problem was reported during three years of field testing of these units in severe climates of the United States and Canada, nor during two previous winters' operation of production units.

In the reported incidents, when the exhaust vent became partially frozen shut, gas pressure would build in the exhaust line eventually permitting exhaust gases to exit through the drip leg of the furnace. Exhaust gases were, therefore, released to the house.

In none of the reported incidents, to date, have any injuries, illnesses or lasting adverse effects been reported as resulting from these incidents, although the residents reported feeling ill, and in some cases left their homes to seek medical attention. In all cases, inspection of their furnaces was sought.

#### REMEDIAL ACTION

Although the unusual and unprecedented weather conditions could not have been reasonably anticipated nor duplicated by product testing, and they are not reasonably expected to re-occur, Lennox has nevertheless taken steps as a marketing response related to providing superior customer service for a premium product to preclude any adverse consequences from a reoccurrence of these conditions regardless of how unlikely such a reoccurrence may be.

To deal with this isolated and newly discovered problem, Lennox advised dealers in the affected cold weather areas to insulate all exhaust pipes passing through any unconditioned space and all portions of exhaust pipes extending outside the structure and Lennox developed a kit for retrofitting the Pulse furnaces involved in the incidents and those installed in areas subject to similar weather conditions. These cold weather kits include; (1) a pressure switch for installation in the exhaust vent of the furnace which will cause the furnace

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to automatically shut off if there is a pressure buildup in the exhaust system in excess of the switch limits, which limits are set by furnace input size, (2) a small 1/2" vent pipe added to break any siphonage action of condensate in the drip leg assembly which might otherwise occur as a result of pressure buildup, and (3) the installation of a 3/16" restrictor in the drain from the drip leg assembly to also prevent gases from being vented through this exit. With the installation of the pressure switch in the flue pipe, the furnace will be shut down if pressure builds up due to exhaust restriction in excess of from 2.75" to 5" water column (depending upon the furnace size). The described changes in the drip leg condensate drain assembly assure that below these water column pressures no gases can be vented through the drip leg.

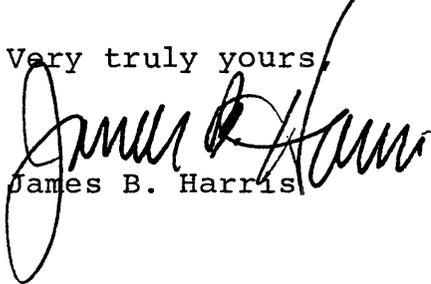
On January 23, 1984, a letter, service bulletin, and description of the cold weather retrofit kit were sent to all Lennox dealers. Copies of these documents are attached to this letter. To date, some 6,000 kits have been installed. In order to increase the number of retrofits, a second letter, a copy of which is attached, was sent to dealers.

Beginning February 20, 1984, the cold weather kit was incorporated on all Pulse furnace production.

I trust this information is sufficient for your purposes. I would appreciate your contacting me in the event that you have any additional questions. Representatives of Lennox are willing to meet with you, if necessary, to discuss this situation.

Lennox believes the information in this letter detailing the problem experienced with the Pulse furnaces described herein constitutes trade secrets or confidential proprietary information and, therefore, requests such information not be disclosed to the public pursuant to exemption D-4 of the Freedom of Information Act. In addition, Lennox specifically requests that this letter and the attachments not be disclosed to the public as required by Section 6(b)(5) of the Consumer Product Safety Act.

Very truly yours,

  
James B. Harris

JBH:ijm

Enclosures

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<u>Date</u>	<u>Loation</u>	<u>Model #</u>	<u>Serial #</u>	<u>Approx. Mfg.Date</u>
12/20/83	West Allis WI	G14Q3-40-2	5882K08199	Oct. 1982
12/24/83	Hutchison MN	G14Q3-60-1	5883D05854	Apr. 1983
12/24/83	Milford IA	G14Q3-60	unknown	unknown
12/28/83	Young America MN	G14Q3-60-3	5883J36118	Sept. 1983
12/24/83	Milwaukee WI	G14Q3-40	5883C03327	Mar. 1983
12/27/83	Jolley, IA	G14Q3-80	unknown	unknown
12/24/83	Gilbertville IA	G14Q3-60	unknown	unknown
12/26/83	Ackley IA	G14Q3-60	unknown	unknown
12/24/83	Madelia MN	G14Q3-40	unknown	unknown
12/25/83	Milwaukee WI	G14Q3-80-1	5882M01715	Dec. 1982
12/23/83	Albert Lea MN	G14Q3-80	unknown	unknown
12/19/83	Lakefield MN	G14-60	unknown	unknown
12/17/83	Anoka MN	G14Q3-40	unknown	unknown
12/22/83	Kingsley IA	G14Q3-80-2	5883A01886	Jan. 1983
12/22/83	Sioux City IA	G14Q3-60	unknown	unknown
12/19/83	Bettendorf IA	G14Q3-40	5883C03511	Mar. 1983
1/4/84	Glen Willow OH	G14Q3-80	unknown	unknown
12/24/83	Chagrin Falls OH	G14Q5-100	unknown	unknown
12/3/83	Boone IA	G14Q3-80	unknown	unknown

HEATING AND AIR CONDITIONING  
ESTABLISHED 1895

P. O. BOX 809000  
DALLAS, TEXAS 75380-9000  
PHONE: 214 + 980-6000

January 23, 1984

Dear Lennox Dealer:

The 1983-84 winter has produced unusual record low temperatures accompanied by high winds in much of the mid-section of the U. S., breaking all previous records in many areas and resulting in extremely high wind-chill factors.

Just prior to and after Christmas we received reports of frozen vents on G14 furnaces from areas which experienced this record cold, high wind combination. Our engineers and service personnel took immediate steps to work with Lennox dealers in order to observe the condition, correct the individual problems, and develop alternate methods of vent termination to preclude a similar occurrence in the many thousands of successful G14 installations. (During this time we also observed frozen sewer vents, hot water heater vents, and a few conventional furnace vents in these areas.)

Our three years of field test of the G14 in severe climates of the U. S. and Canada and two previous winters' operation of production units produced no reports of similar freeze-ups.

Observations and tests indicate that recirculation is the prime cause of intake freeze-ups. Exhaust freeze-ups are caused by the exhaust pipe passing through unheated crawl spaces, basements, or attics, which allows the already low temperature discharge flue gas to more easily reach the freezing point at the termination of the vent in these unusual weather conditions. Very short cycles can also aggravate exhaust freeze-ups. In addition, recirculation in any climate can cause short cycles and intermittent cutout.

The attached bulletin addresses methods that have been successful in the field in alleviating either of these conditions.

For units that operate in areas where below 0°F temperatures are experienced frequently, Lennox has produced a G14 Cold Weather Kit consisting of an exhaust pressure switch and condensate line vent. This kit, when installed, will prevent the siphoning of the condensate trap and provide shutdown in case of operating conditions resulting in exhaust freeze-up. In addition, outside portions of the exhaust line should be insulated and in those installations involving the exhaust pipe traveling through unheated space, we recommend exhaust pipe insulation as shown in the

attached bulletin. These kits should be ordered through normal channels from your Lennox Division and should be installed on all G14 installations promptly. There is no charge for the kit and Lennox will allow a credit for your direct reasonable labor cost for the kit installation.

G14 Cold Weather Kit

<u>Model No.</u>	<u>Kit No.</u>	<u>Catalog No.</u>
G14-40	LB-52985CA	83F00
G14-60/80	LB-52985CB	83F01
G14-100/130	LB-52985CC	83F02

Cold weather kit components will be installed in all production units in the near future.

Yours truly,

LENNOX INDUSTRIES INC.

Attachment

# Service and Application Notes

Date January 23, 1984

File No. H-84-1

Subject G14 VENTING

HEATING

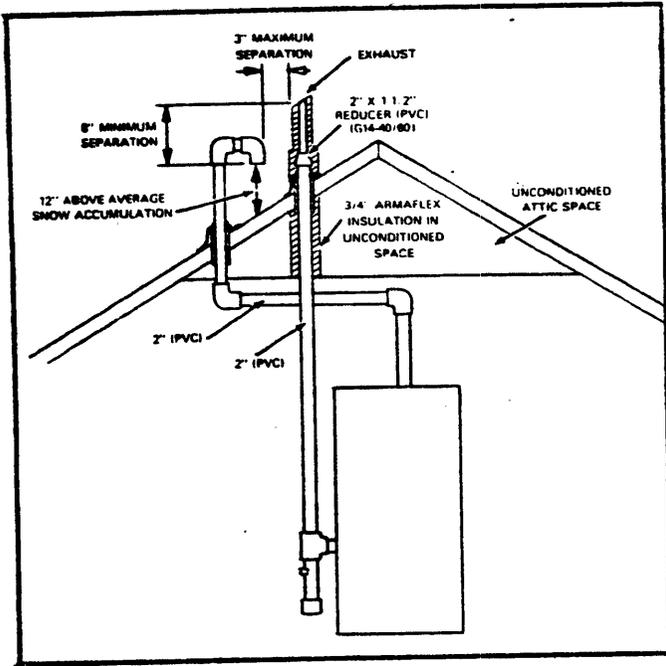
During the recent record low temperatures accompanied by high winds in many parts of the U. S. and Canada some freeze-ups in the venting system occurred, causing nuisance heat interruptions.

Our 3 years of field test and 2 previous winters operation on production units produced no reports of similar operational interruptions.

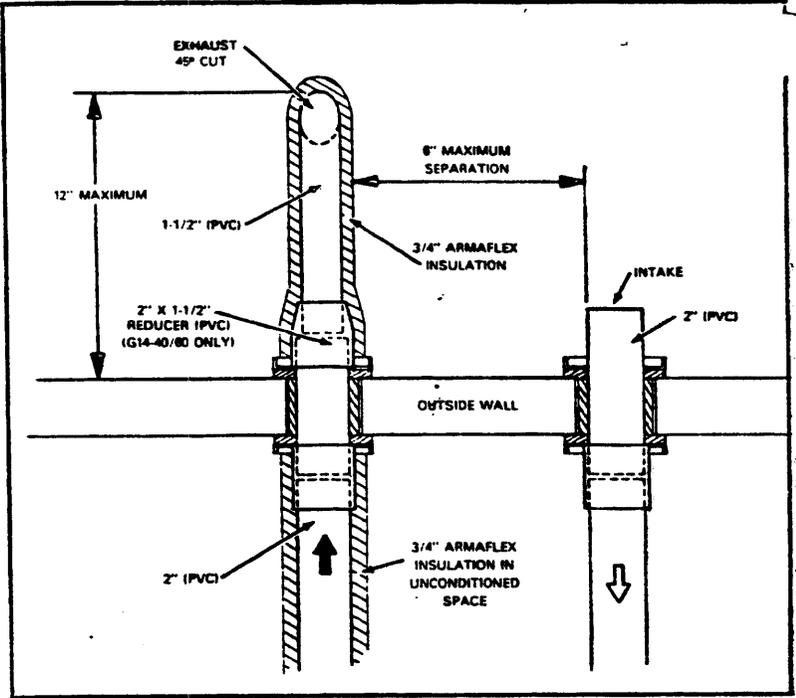
Lennox engineers and service personnel have worked with Lennox dealers in order to observe the conditions and develop alternate methods of vent termination.

Observation of field tests indicate that recirculation of the products of combustion into the combustion air intake is a primary contributor to short cycling or temporary cutout of the flame and frozen combustion air intake pipes. In order to reduce the possibility of recirculation, the exhaust and intake pipe should be brought close together. See attached sketches for details.

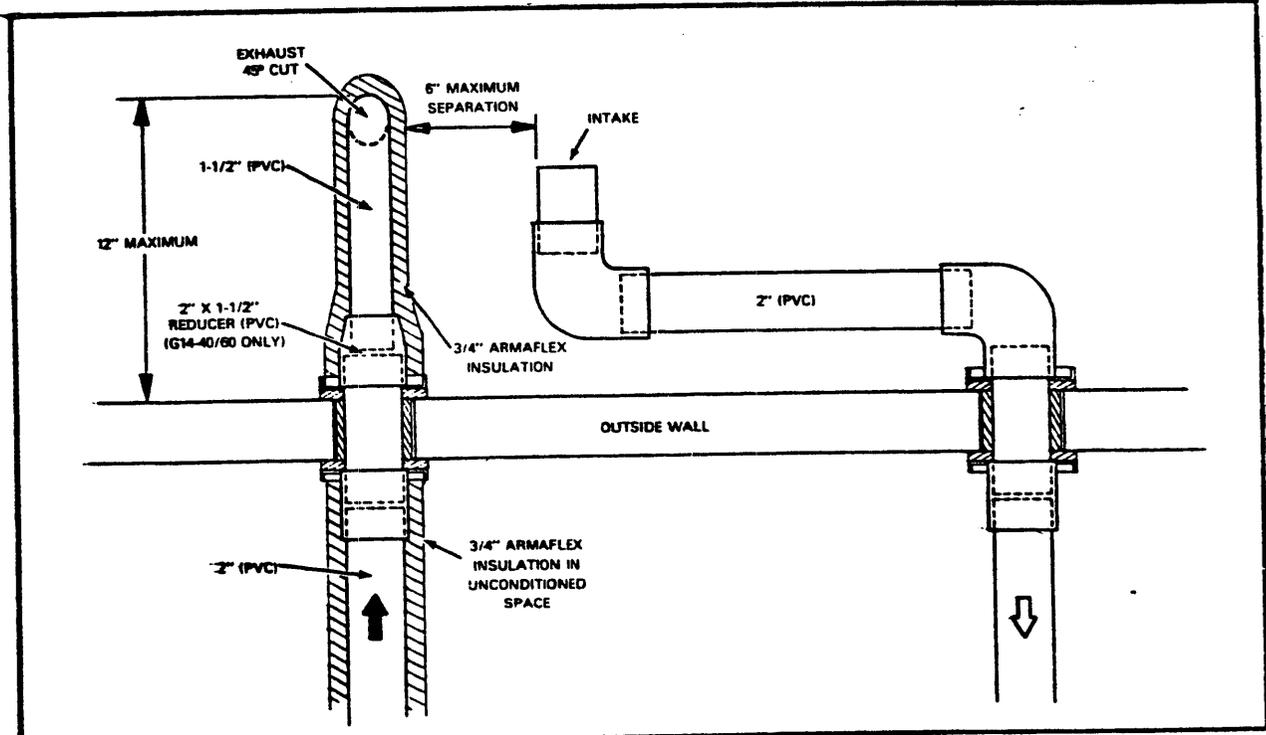
Exhaust freeze-ups can occur at low ambients (0°F and lower) and all exhaust pipe exposed to unheated areas; i.e., crawl spaces and attics, should be insulated, including all portions extending outside the structure. See attached sketches for details.



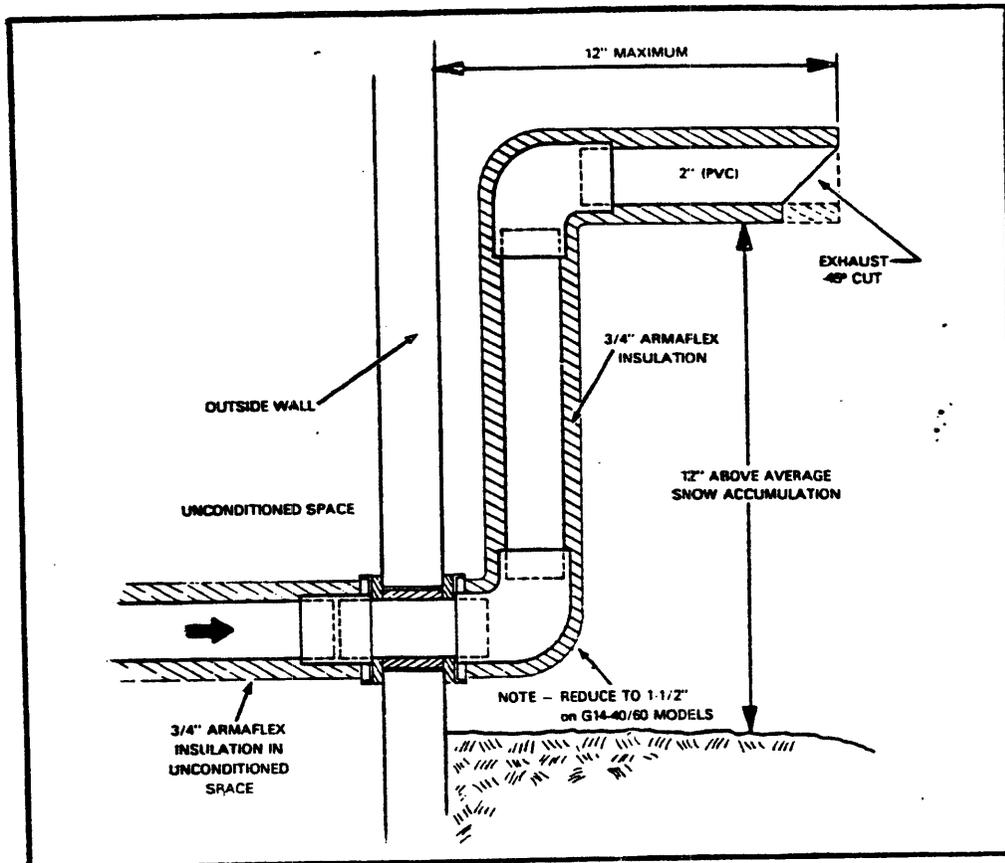
**ROOF TERMINATION**



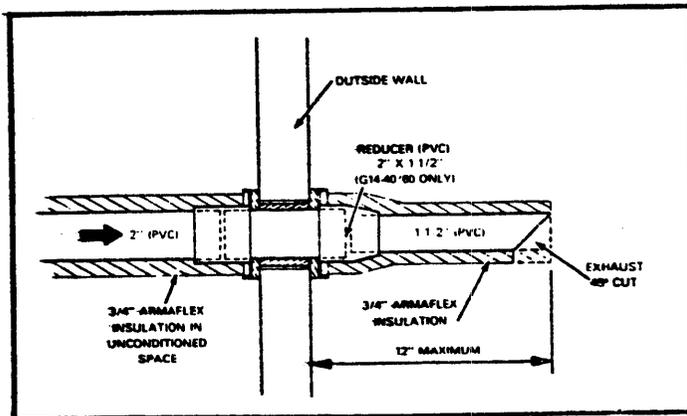
**TOP VIEW WALL TERMINATION**



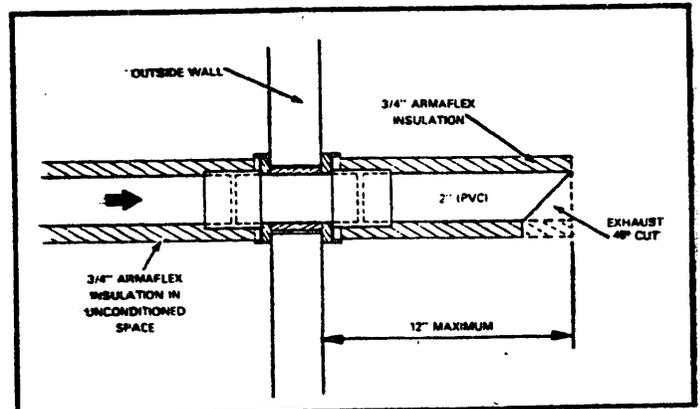
**TOP VIEW WALL TERMINATION**



**EXHAUST LINE  
WALL TERMINATION**



**EXHAUST LINE  
WALL TERMINATION  
(G14-40/60)**



**EXHAUST LINE  
WALL TERMINATION  
(G14-80/100/130)**

# **LENNOX** Industries Inc.

CORPORATE OFFICES  
Lennox Center

HEATING AND AIR CONDITIONING  
ESTABLISHED 1895

P. O. BOX 809000  
DALLAS, TEXAS 75380-9000  
PHONE: 214 + 980-6000

May 10, 1984

Dear Lennox Dealer:

Re: G14 Pulse Furnace

On January 23rd we wrote to explain the procedure for dealing with potential freeze-up of vent pipes on Pulse furnaces during unusually cold weather. A copy of that letter is enclosed for your review.

In that same letter we recommended a cold weather kit be installed on Pulse furnaces likely to be exposed to temperature below 0 F for any extended period of time.

Enclosed is a list of G14 furnaces purchased by your company through March 17, 1984. Under separate cover we are sending you enough cold weather kits to install on approximately 25% of these furnaces. Order additional kits from your Lennox division as required.

Furnaces manufactured after February, 1984 (with serial numbers of 5884C and later or 6384C and later) are equipped with cold weather kits and will not require field installed kits.

The kits have been shipped to you on a no-charge basis. However, you will find attached to this letter a copy entitled "Verification of G14 Cold Weather Kit Installation." In order to receive credit for your direct labor costs it will be necessary for you to fill out the three part form, one for each unit, and return the original and first copy to the division service manager.

IT IS OUR STRONG RECOMMENDATION THAT THESE KITS BE INSTALLED ON ALL OF THE FURNACES LISTED PRIOR TO THE NEXT HEATING SEASON.

Yours truly,

LENNOX INDUSTRIES INC.

Enclosures

VERIFICATION OF G14 COLD WEATHER KIT INSTALLATION

OWNER

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Model Number: G14- \_\_\_\_\_

DEALER

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Serial Number: \_\_\_\_\_

INSTALLED

Date \_\_\_\_\_ By \_\_\_\_\_

Direct Labor Cost \_\_\_\_\_

Dealer Signature \_\_\_\_\_

Original and 2nd copy must be returned to Division Service Manager; 3rd copy for dealer file.

# **LENNOX** Industries Inc.

CORPORATE OFFICES  
Lennox Center

HEATING AND AIR CONDITIONING  
ESTABLISHED 1895

P. O. BOX 809000  
DALLAS, TEXAS 75380-9000  
PHONE: 214+980-6000

January 23, 1984

Dear Lennox Dealer:

The 1983-84 winter has produced unusual record low temperatures accompanied by high winds in much of the mid-section of the U. S., breaking all previous records in many areas and resulting in extremely high wind-chill factors.

Just prior to and after Christmas we received reports of frozen vents on G14 furnaces from areas which experienced this record cold, high wind combination. Our engineers and service personnel took immediate steps to work with Lennox dealers in order to observe the condition, correct the individual problems, and develop alternate methods of vent termination to preclude a similar occurrence in the many thousands of successful G14 installations. (During this time we also observed frozen sewer vents, hot water heater vents, and a few conventional furnace vents in these areas.)

Our three years of field test of the G14 in severe climates of the U. S. and Canada and two previous winters' operation of production units produced no reports of similar freeze-ups.

Observations and tests indicate that recirculation is the prime cause of intake freeze-ups. Exhaust freeze-ups are caused by the exhaust pipe passing through unheated crawl spaces, basements, or attics, which allows the already low temperature discharge flue gas to more easily reach the freezing point at the termination of the vent in these unusual weather conditions. Very short cycles can also aggravate exhaust freeze-ups. In addition, recirculation in any climate can cause short cycles and intermittent cutout.

The attached bulletin addresses methods that have been successful in the field in alleviating either of these conditions.

For units that operate in areas where below 0°F temperatures are experienced frequently, Lennox has produced a G14 Cold Weather Kit consisting of an exhaust pressure switch and condensate line vent. This kit, when installed, will prevent the siphoning of the condensate trap and provide shutdown in case of operating conditions resulting in exhaust freeze-up. In addition, outside portions of the exhaust line should be insulated and in those installations involving the exhaust pipe traveling through unheated space, we recommend exhaust pipe insulation as shown in the

attached bulletin. These kits should be ordered through normal channels from your Lennox Division and should be installed on all G14 installations promptly. There is no charge for the kit and Lennox will allow a credit for your direct reasonable labor cost for the kit installation.

G14 Cold Weather Kit

<u>Model No.</u>	<u>Kit No.</u>	<u>Catalog No.</u>
G14-40	LB-52985CA	83F00
G14-60/80	LB-52985CB	83F01
G14-100/130	LB-52985CC	83F02

Cold weather kit components will be installed in all production units in the near future.

Yours truly,

LENNOX INDUSTRIES INC.

Attachment

23 JUL 1984

James A. Harris, Chairman  
Department 4 Bldg  
3300 First City Center  
1100 Pacific Plaza  
Dallas, Texas 75202

RE: 1984-07-04-105  
Furnace Burners

Dear Mr. Harris:

Thank you for your written report on behalf of General Industries, Inc., dated June 27, 1984, under section 13(b) of the Consumer Product Safety Act, as amended (CPSC) (16 U.S.C. 1445(b)). Your report, as indicated, that certain vents on 19 of model 65,000 Series Pulse Burners were partially shut during November 1-1983 painting conduct pipes to be briefly vented into the buildings where the furnaces were installed before they shut off. You explained that the incidents occurred during a period of unprecedented low temperatures and high winds in the areas where the 19 furnaces were located.

Included for your reference are the Consumer Product Safety Act and the Commission's regulations 16 CFR Part 1115 "Substantial Product Hazard Reports." These documents explain the Commission's authority and policy with regard to products which may present substantial product hazards and also explain the rights and obligations of your client under the act.

Please provide the "Full Report" information specified by 16 CFR 1115.13(b) and any requested information not yet supplied so that we will be able to make an accurate assessment of the potential safety hazard associated with this product. Please include copies of any test reports and analyses, safety-related complaints, injury reports, lawsuits or claims involving the subject product or similar products.

In addition, please provide the following:

1. A technical explanation of the process which caused the furnace to shut off after the conduct vent from partially shut.
2. A diagram showing typical installation with and without the newly added 1/4 inch vent pipe and 2/16 inch restriction.
3. Test data demonstrating the effectiveness of the vent.

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...in the event that you have not the facilities to conduct such a preliminary investigation as to whether this product presents a substantial public health hazard. It is the intent of this regulation that you transmit this Division with all information necessary to permit an accurate assessment of the potential safety hazard involved with the product.

The Commission also receives requests for information as provided for in this section 15(b) of the CPMA. Section 6(b)(5) of the CPMA prohibits the release of such information unless a pre-conditional notice has been accepted in writing, a complaint has been filed or a prior consent to such release. (See Section 6(a) of the CPMA, as amended (enclosed)).

In addition to the above, if you submit any information that you consider to be a trade secret, you must mark it as "confidential" in accordance with Section 6(a)(3) of the CPMA, as amended (enclosed). If you do not request confidential treatment at the time of your submission or within ten days thereafter, the staff will assume that you do not consider information in your submission to be a trade secret or otherwise exempt from disclosure under Section 6(a) of the CPMA and the Freedom of Information Act 5 U.S.C. 552(b)(4).

Please note that your firm has a continuing obligation to supplement or correct its "Full Report" as new or different information becomes known. For instance, if after filing your "Full Report" you receive information concerning other incidents or injuries or information that affects the scope, prevalence or seriousness of the defect or hazard, you are obligated to report such information to this Division.

If you need assistance or if you have any questions, please contact Marvin Barthert, Corrective Actions Division, telephone: (301) 491-6600. Thank you for your cooperation in reporting under Section 15 of the Consumer Product Safety Act. A response within 10 working days would be appreciated. Please provide a copy of your response to the Commission Regional Office listed below.

Sincerely,

CACA/DThome:lmw:7/11/84  
Reading, Records, Chron

David W. Thome, Director  
Corrective Actions Division

Enclosures

Certified Mail

cc: Southwest Regional Office  
Room 1 C 10, 1100 Commerce Street  
Dallas, Texas 75242

THOMPSON & KNIGHT

ATTORNEYS AND COUNSELORS

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208 WEST FOURTEENTH STREET  
AUSTIN, TEXAS 78701

TWO ENERGY SQUARE  
4849 GREENVILLE AVENUE  
DALLAS, TEXAS 75206

DIRECT DIAL:  
(214) 969-1102

September 5, 1984

~~RESTRICTED~~

FEDERAL EXPRESS

Mr. David W. Thome,  
Director Corrective Actions Division  
United States Consumer Products  
Safety Commission  
Washington, D. C. 20207

Re: CPSC RP 84-105  
Pulse Furnace

Dear Mr. Thome:

In your letter dated July 23, 1984, you requested that Lennox Industries, Inc. ("Lennox") provide answers to three questions your staff had after reviewing a report filed by Lennox on June 27, 1984, involving the Pulse furnace. The answers to your questions are as follows:

1. Technical explanation of the process which caused the furnace to shut off after the exhaust vent froze partially shut.

As the exhaust freezes up, the flow area for the products of combustion exiting the furnace heat exchanger through the exhaust becomes restricted. As this outlet restriction increases, the pulsating combustion process has a diminished capability to draw in fuel and air and eventually cannot sustain itself. At this instant, the electronic flame safety circuit will cause the automatic gas valve to close, stopping the gas delivery to the combustion chamber.

The furnace will then try to re-ignite under supervision of the ignition control system. After five successive unsuccessful trials for ignition, the ignition system will not re-try until the power supply to it has been de-energized and re-energized. This requires satisfying the existing heat demand at the thermostat by lowering the setting below room temperature and then raising it to a demand point above room temperature, or interrupting the main power supply to the unit and reconnecting that supply.

Mr. David W. Thome  
September 5, 1984  
Page Two

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2. A diagram showing typical installation with and without the newly added 1/2 inch vent pipe and 3/16 inch restrictor.

Attached to this letter as Exhibit "A" is a diagram with two figures. Figure 1 depicts typical installation without the 1/2 inch vent pipe and 3/16 inch restrictor. Figure 2 depicts typical installation with the 1/2 inch vent pipe and 3/16 inch restrictor.

3. Test data demonstrating the effectiveness of the fix.

Lennox has no recorded test data; however, based upon oral field reports, an engineering analysis followed by operational tests of the retrofit kit and production change showed the effectiveness of the changes as described below. The following analysis is presented in lieu of test data to more clearly explain the function and effectiveness of the retrofit kit.

Under the abnormal operation condition of the partially frozen closed exhaust vent, the increased pressure exerted by the exhaust gas on the water surface in the drip leg apparently permitted the drip leg to lose its water seal, thus providing a temporary flow path for the escape of vent gases prior to the units shut down from lack of combustion air.

The water seal apparently was lost under one of the following conditions:

1. The increased exhaust pressure was sufficient to overcome the 13 inch on the 40,000, 60,000 and 80,000 Btu input models (or 17 inch on the 100,000 input model) hydraulic head of the stand pipe (drip leg) and forced the condensate out, thus emptying the drip leg.
2. The drip leg emptied due to a siphon action. The condensate left the trap at a sufficiently high rate that the flow totally sealed the 1/2 inch pipe across the horizontal portion thus completely emptying the drip leg by siphon effect activated by the increased exhaust pressure.

To prevent these occurrences, the following modifications were made:

Mr. David W. Thome  
September 5, 1984  
Page Three

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1. The addition of a pressure switch on the exhaust to limit the exhaust pressure to values substantially less than the hydraulic head of the stand pipe, which switch will terminate unit operation in the event of exhaust pressure above normal but less than the hydraulic head.
2. Provide an atmospheric opening in the 1/2 inch condensate disposal pipe so that a total seal cannot be created by the condensate leaving the trap, thereby eliminating the potential for the creation of a siphon.
3. Limit the rate of flow from the condensate line to 14 percent of the original design by restricting the flow areas with a 3/16 inch diameter passage to limit the flow of condensate and increase the time necessary to empty the trap of condensate.

You also requested that we provide you with any "Full Report" information not previously supplied. I believe all of the requested "Full Report" information, with the exception of safety-related complaints or injury reports, has been provided. Since our last letter Lennox has received a report of one other incident described as follows:

Date of Incident: 12/25/83;  
Location: Mequon, Wisconsin;  
Model No.: G14Q3-40;  
Serial No.: SN638H31679.

Attached to this letter as Exhibit "B" is a summary of injury reports received by Lennox with respect to the 20 reported incidents.

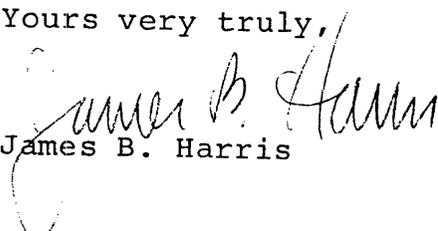
I trust that this information is fully responsive to your request. I apologize for the delay in obtaining this information. If you have any further questions, please do not hesitate to contact me. Lennox believes the information in this letter constitutes trade secrets or confidential proprietary information, and, therefore, therefore requests such information not be disclosed to the public pursuant to exemption D-4 of the Freedom of Information Act. In addition, Lennox specifically request that this

Mr. David W. Thome  
September 5, 1984  
Page Four

~~RESTRICTED~~

letter and the attachments not be disclosed to the public as required by Section 6(b)(5) of the Consumer Product Safety Act.

Yours very truly,

  
James B. Harris

JBH/JB  
Encls.

~~NESTOR~~

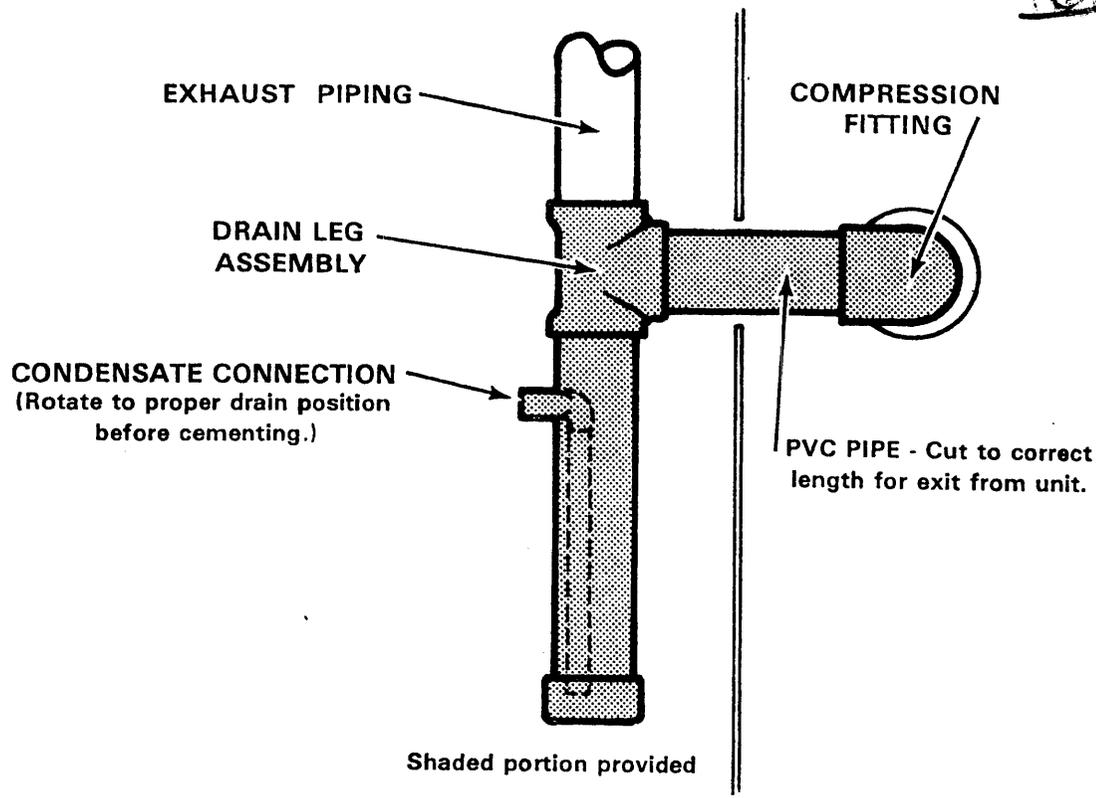


FIGURE 1

DO NOT BLOCK ORIFICE WITH GLUE USED TO INSTALL TEE.

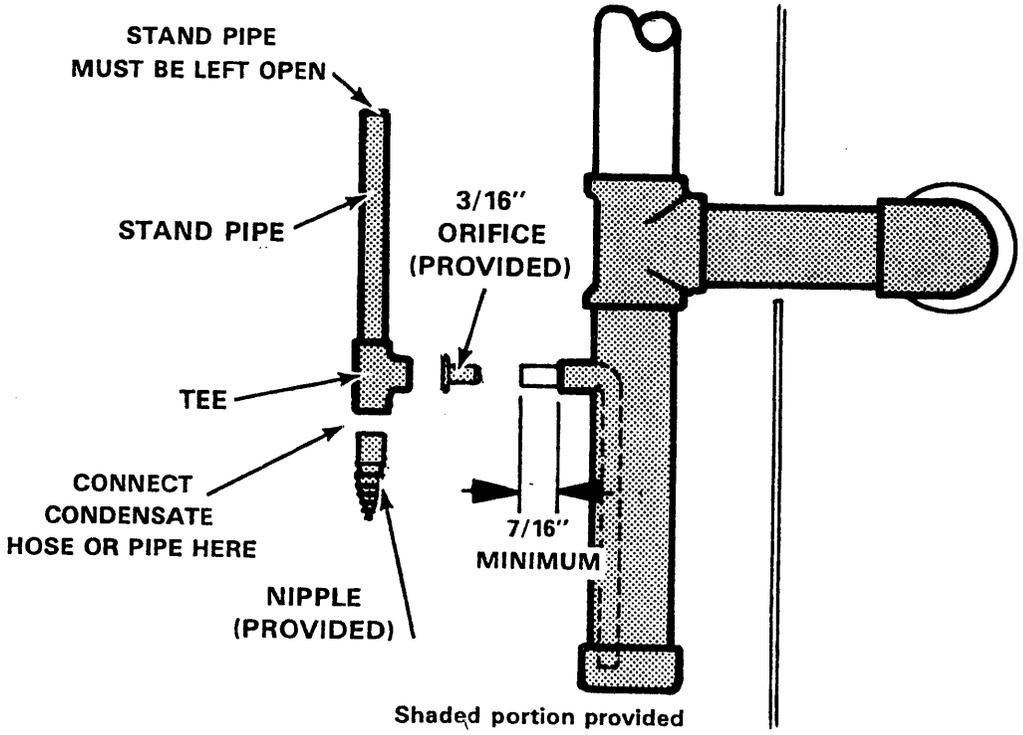


FIGURE 2

~~RESTRICTED~~

EXHIBIT "B"

The following is a summary of injury reports received by Lennox with respect to the Pulse furnace. The numbers of the incidents correlate to the incidents reported in the exhibit attached to Lennox's letter of June 27, 1984 as numbered on Exhibit "C".

INCIDENT NO. 2: Three people complained of nausea and feeling ill. They were examined at a hospital and released, with no report of ill effects. A review of pertinent information establishes that the unit in question was installed by the homeowner. To date, Lennox has been unable to determine whether such installation contributed to or caused any problem that might have been experienced with the furnace.

INCIDENT NO. 4: Four individuals complained of feeling ill and nausea. They were given oxygen in a rescue unit, spent two hours at a hospital and were released with no report of ill effects. Lennox's review of the facts establishes a fairly strong possibility of the involvement of sewer gas as a result of loose seals on plumbing vents, possible propane gas leaks from an improperly installed and an extremely tight house.

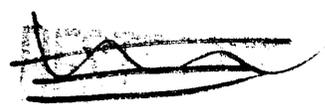
INCIDENT NO. 5: Two individuals complained of feeling ill and nausea. They received oxygen from the fire department and hospital. They were examined at the hospital, detained for three hours and then released without any report of ill effects.

INCIDENT NO. 13: Several members of a family living in this house complained of feeling ill. They apparently did not seek any medical examination. No reports of any ill effects have been reported.

INCIDENT NO. 16: Report of one individual who complained of feeling ill. He was taken to a hospital, examined and released. No reports of any ill effects. From available information, it appears the furnace had shut down on a number of occasions, was reset by the owner who discovered gas coming from the condensate but took no action to correct the situation.

INCIDENT NO. 18: Six individuals claim to have suffered headaches and nausea. They were examined by a doctor who was a neighbor of a relative of one of the six individuals. No reports of any ill effects. No reports of any medical treatment.

Lennox has also received sketchy oral communications on Incident Nos. 3, 8, 12, 14 and 19 which indicate that individuals in each case may have claimed they experienced nausea, headaches or feeling ill, that in addition they were examined at a hospital or doctor's office and released with no reports of any ill effects.



<u>Date</u>	<u>Loation</u>	<u>Model #</u>	<u>Serial #</u>	<u>Approx. Mfg.Date</u>
1. 12/20/83	West Allis WI	G14Q3-40-2	5882K08199	Oct. 1982
2. 12/24/83	Hutchison MN	G14Q3-60-1	5883D05854	Apr. 1983
3. 12/24/83	Milford IA	G14Q3-60	unknown	unknown
4. 12/28/83	Young America MN	G14Q3-60-3	5883J36118	Sept. 1983
5. 12/24/83	Milwaukee WI	G14Q3-40	5883C03327	Mar. 1983
6. 12/27/83	Jolley, IA	G14Q3-80	unknown	unknown
7. 12/24/83	Gilbertville IA	G14Q3-60	unknown	unknown
8. 12/26/83	Ackley IA	G14Q3-60	unknown	unknown
9. 12/24/83	Madelia MN	G14Q3-40	unknown	unknown
10. 12/25/83	Milwaukee WI	G14Q3-80-1	5882M01715	Dec. 1982
11. 12/23/83	Albert Lea MN	G14Q3-80	unknown	unknown
12. 12/19/83	Lakefield MN	G14-60	unknown	unknown
13. 12/17/83	Anoka MN	G14Q3-40	unknown	unknown
14. 12/22/83	Kingsley IA	G14Q3-80-2	5883A01886	Jan. 1983
15. 12/22/83	Sioux City IA	G14Q3-60	unknown	unknown
16. 12/19/83	Bettendorf IA	G14Q3-40	5883C03511	Mar. 1983
17. 1/4/84	Glen Willow OH	G14Q3-80	unknown	unknown
18. 12/24/83	Chagrin Falls OH	G14Q5-100	unknown	unknown
19. 12/3/83	Boone IA	G14Q3-80	unknown	unknown

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October 24, 1984

FEDERAL EXPRESS

Mr. Marvin Everhart  
Corrective Actions Division  
United States Consumer Products  
Safety Commission  
Washington, D. C. 20207

Re: CPSC RP84-105  
Pulse Furnace

Dear Mr. Everhart:

You have requested that Lennox Industries Inc. supply you with a map describing those areas that received cold weather kits for the Pulse furnace. Enclosed with this letter is a copy of a map of the United States bisected by a yellow line. Cold weather kits were sent to dealers located north of that line.

In addition to state boundaries, the map includes heavy lines surrounding circled numbers. Those boundaries represent branch sales areas and the numbers indicate the branch number. The map also includes temperatures for each state. According to the source of that information, Engineering Weather Data developed for the Department of the Air Force, there is a 99 percent chance that during the winter a state will not experience temperatures lower than those included on the map. Since the problem experienced with the Pulse furnace occurred in weather where the lows were 20 to 30 degrees below zero and with wind speeds of up to 40 miles per hour, we could have further reduced the area to receive the cold weather kits but we chose out of an abundance of caution not to do so.

You have also requested that we advise you as to the number of units in the field that have received the cold weather kits. We are still compiling data and hope to have that information to you either late Wednesday afternoon or first thing Thursday.

Mr. Marvin Everhart  
October 24, 1984  
Page Two

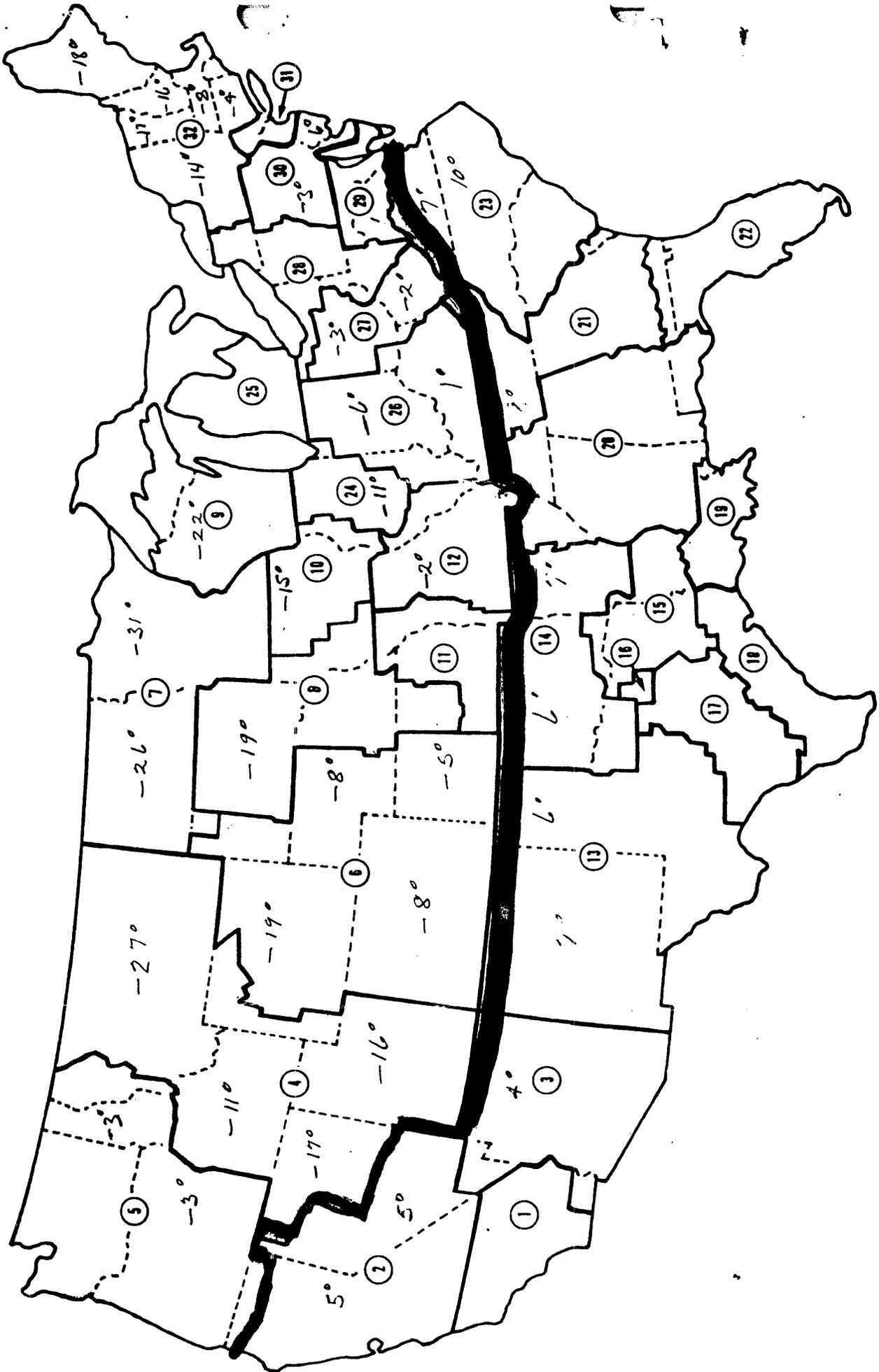
Lennox believes the information in this letter constitutes trade secrets or confidential proprietary information and, therefore, requests such information not be disclosed to the public pursuant to Exemption D4 of the Freedom of Information Act. In addition, Lennox specifically requests that this letter and the attachments not be disclosed to the public as required by Section 6(b)(5) of the Consumer Products Safety Act.

Yours very truly,

  
James B. Harris

JBH/JB  
Encls.

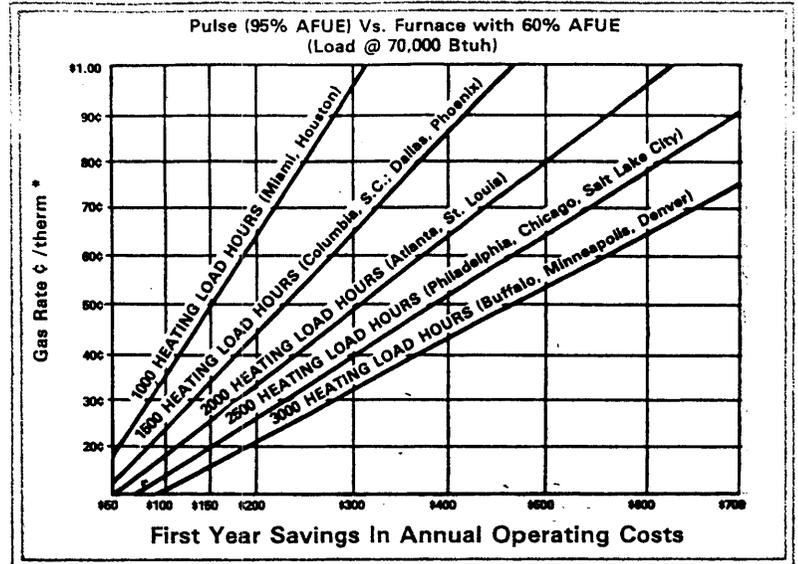
**Lennox Sale Branches**  
(See addresses on other side)



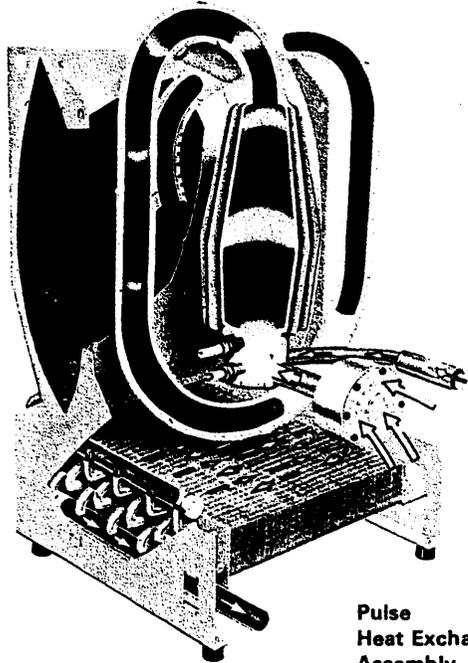
# How Much Energy Can the Lennox Pulse™ Furnace Save?

Plenty. The Pulse efficiency rating is 74.5% better than the lowest gas furnace rating listed in Department of Energy fact sheets. That means the Pulse can meet the same heating demand with about half the gas of those minimum efficiency units.

The chart at the right can help you determine your approximate annual cost savings with the Pulse. Find your fuel price along the vertical column and draw a horizontal line to the diagonal that most closely represents the annual operating hours for your area. (Each diagonal is labeled with cities representative of the various climates.) Then draw a line straight down to the base to find your approximate annual savings with the Pulse versus a standard 60% efficient furnace.



\*Contact your Lennox dealer or local utility to determine your fuel cost.  
Approximate cost per therm = 100 X cost per cubic foot of gas.



Pulse  
Heat Exchanger  
Assembly

Before purchasing this appliance, read important energy cost and efficiency information available from your retailer

## Reliable Performance, Low Cost Installation

Lennox has been building furnaces since 1895, and since that time, it has earned a reputation for quality that is the envy of the industry. This quality is reflected in the Pulse after years of field testing and thousands of hours spent in the Lennox research and development laboratory.

The heart of the system is the revolutionary pulse combustion heat exchanger. It's designed for long service life and carries a 20 year limited warranty against defects and failure. Five up-flow models are available in 40,000, 60,000, 80,000, 100,000 and 130,000 Btuh input capacities.

The Pulse provides the safest, most reliable service possible. Fail-safe controls automatically shut down furnace operation long before combustion products could ever escape.

Easy, low cost installation makes the Pulse an ideal replacement for your old system. It can replace most furnaces built within the last 20 years with virtually no major alterations in ductwork. It even eliminates the need for a chimney in new constructions, since flue products are vented with 2" plastic (PVC) pipe, vertically or through a wall. Outdoor air for combustion can also be piped to the furnace with PVC pipe. The condensate produced by the heat exchanger is non-corrosive to plastic, tile, cast sewer pipes or a septic tank and can be easily routed to any standard drain.

Super efficiency, reliable performance, low cost installation and Lennox quality make the Pulse the furnace for the '80's. We think you'll agree, it couldn't come at a better time.

# LENNOX

AIR CONDITIONING • HEATING

Best Buy Rating . . . Consumers Digest Magazine  
Jan./Feb. 1983 Issue

# LENNOX PULSE FURNACE

## *The Most Efficient Gas Furnace In The World!*

The Lennox Pulse gas furnace is the most significant breakthrough in furnace design in over 40 years. It produces heat unlike any other furnace, with greater efficiency than ever before possible. Operating on a principle of pulse combustion, small quantities of gas and air are electrically ignited at a rate of 60 to 70 times per second. A condensing heat exchanger extracts 200 to 350 degrees more heat from your fuel than is currently possible with conventional gas furnaces. The Pulse can also use propane gas.

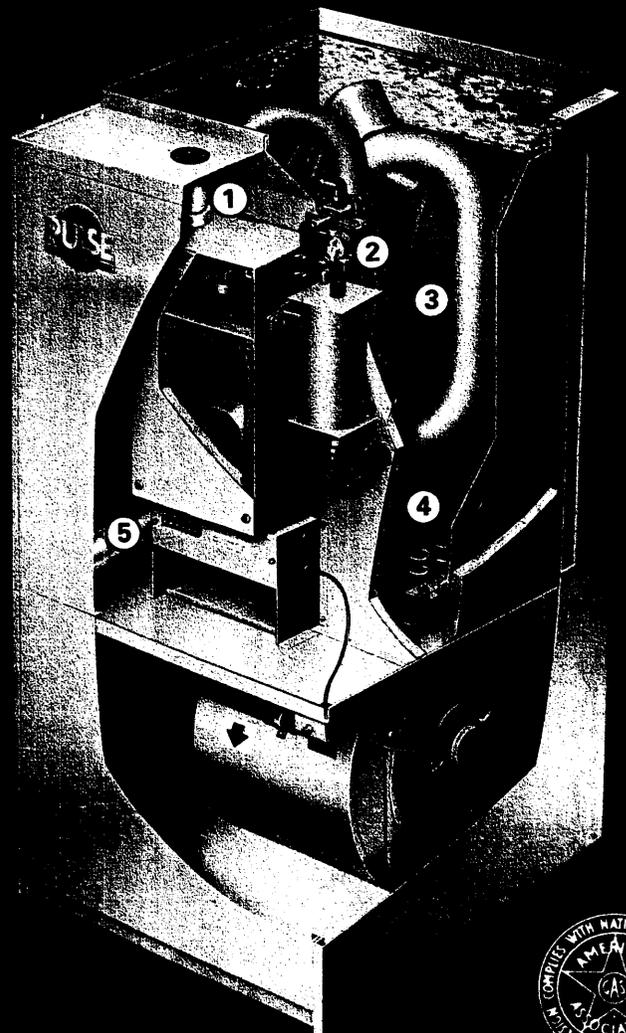
### *Unprecedented Heating Efficiency*

Since all gas furnaces require venting of combustion gases, heat is lost up the flue or chimney. Therefore, no gas furnace can be 100% efficient. But if your present gas furnace is over 10 years old, it is probably in the range of 55% to 60% efficient\*. That means as much as 45% of the heat is vented outdoors and 45 cents of every heat dollar you spend is wasted. But the Pulse is up to 97% efficient\*, with only 3% heat loss due to combustion venting. Some heat loss is inevitable, but why continue to lose 45% when you can cut that heat loss to a minimum of only 3%?

This difference in efficiency can mean a drastic reduction in your monthly bills — enough to justify replacing your current unit today, even though it still operates.

\*Annual Fuel Utilization Efficiency as determined by Department of Energy testing standards. The higher the percentage, the more heat you receive from the same amount of fuel.

- ① Air Intake Pipe    ② Gas Valve    ③ Combustion Chamber
- ④ Heat Exchanger Coil    ⑤ Flue Vent Pipe

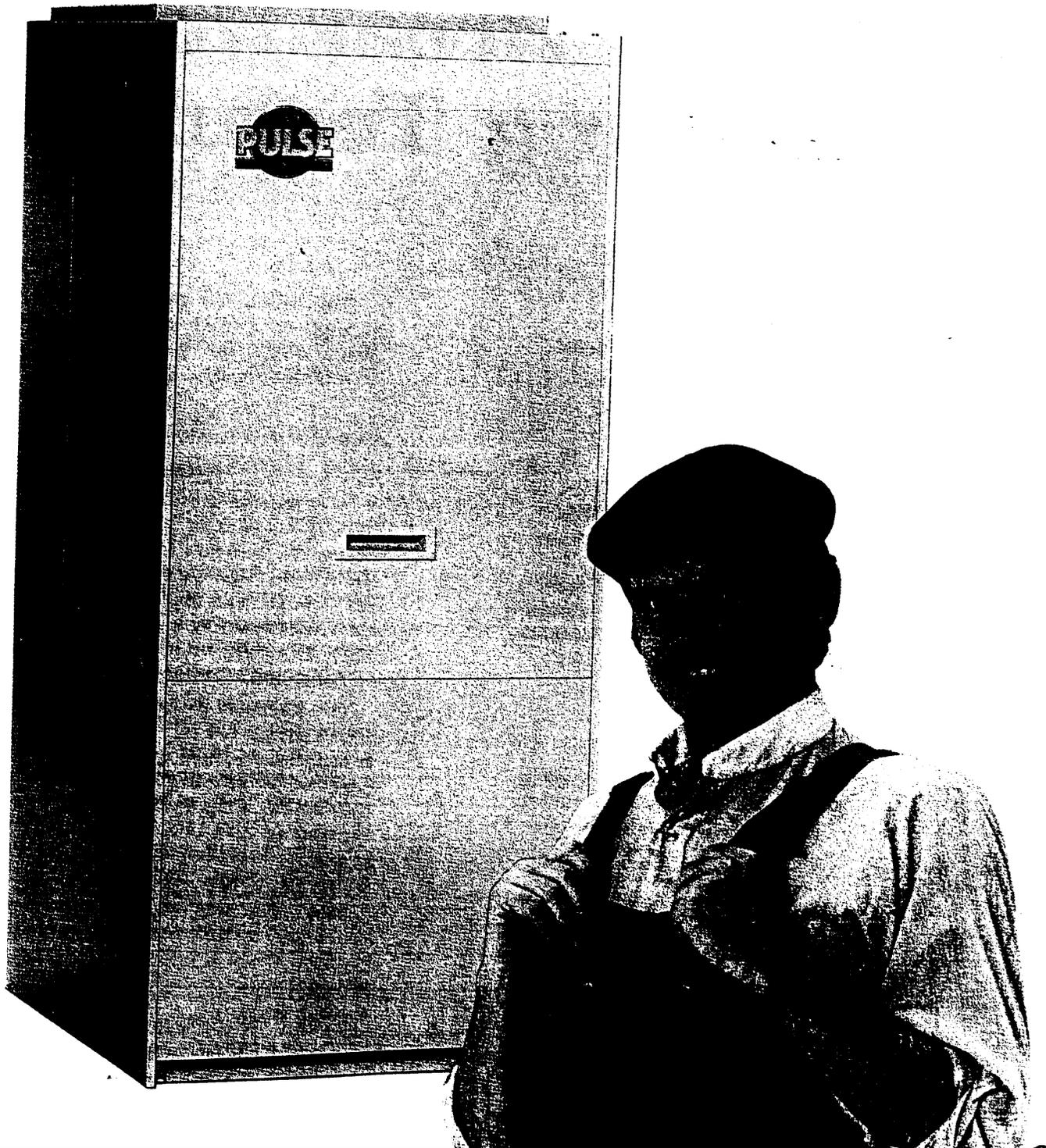


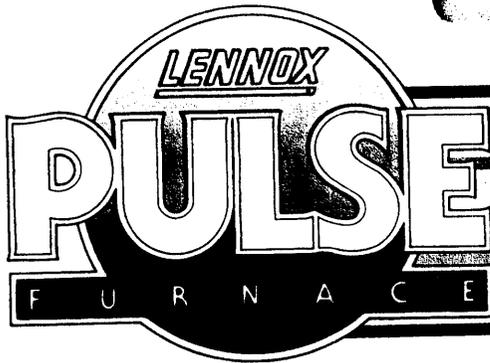
For a free reprint of the Consumers Digest article, contact your local independent Lennox dealer or write: Lennox Industries Inc.  
Department CD  
P.O. Box 400450  
Dallas, Texas 75240



**LENNOX**  
**PULSE**  
FURNACE

**The Most Efficient Gas Furnace In The World!**





# A Major Breakthrough In Heating Technology

## Reliable Cold Weather Comfort at 97% Efficiency

The Lennox Pulse produces heat unlike any other furnace, squeezing more heat from your fuel than ever before possible.

Conventional gas furnaces send 300 to 450 degrees of heat up the flue or chimney due to venting requirements. But the Pulse furnace flue temperature is only around 100 degrees. That's because the Pulse extracts 200 to 350 degrees more heat from the same amount of gas. This kind of efficiency translates into big savings for you on the bottom line of your heating bill.

## More Heat, Less Waste

Since all gas furnaces require venting of combustion gases, none can be totally 100% efficient. But if your present gas furnace is over 10 years old, it is probably in the range of 55% to 60% efficient\*. That means as much as 45% of the heat is vented outdoors (and 45 cents of every heat dollar you spend is wasted.)

But the Pulse is up to 97% efficient\*, with only 3% heat loss due to combustion venting. Some heat loss is inevitable, but why continue to lose 45% when you can cut that heat loss to a minimum of only 3%?

The Pulse can reduce your heating bills enough to justify replacing your current unit today, even though it still operates. The Pulse is that efficient!

## Extensive Research and Development

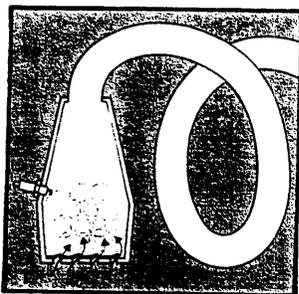
This amazing efficiency is the result of over five years of field testing and research. Lennox technology has made the Pulse furnace easy to install and service. (It can replace any Lennox up-flow furnace installed in the last 20 years with virtually no alterations in duct, cooling coil or accessories.)

The Lennox Pulse furnace has a lot more going for it . . . low cost installation, high quality components, easy serviceability and quiet, trouble-free operation. This outstanding design is backed by the Lennox reputation for quality, unequalled in over 87 years as an industry leader and innovator.

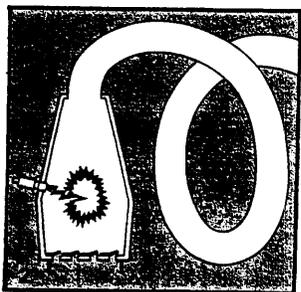
The days of cheap energy are over, and the Pulse is one way you can still enjoy economy without sacrificing comfort. We think you'll agree, it couldn't come at a better time.

\* Annual Fuel Utilization Efficiency rating as determined by Department of Energy testing standards. The higher the percentage, the more heat you receive from the same amount of fuel.

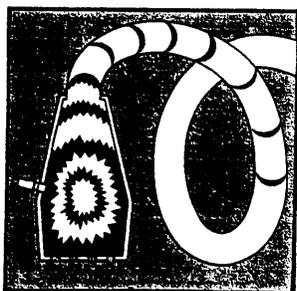
# How Pulse Furnace Combustion Works



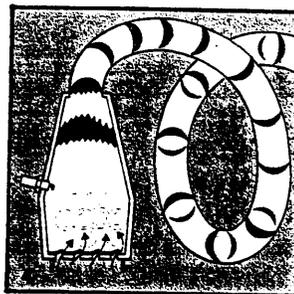
1. The heating process begins as air and gas are introduced into the combustion chamber to mix near the igniter.



2. A spark creates the initial combustion, which in turn causes a positive pressure buildup that closes off the air and gas inlets.

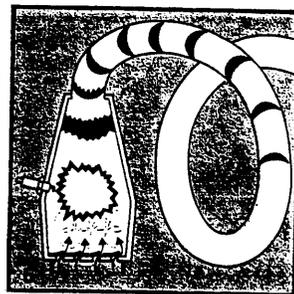


3. This pressure then relieves itself by forcing the products of combustion down a tail pipe. These combustion products are then vented outdoors by means of 2" PVC pipe (run either vertically or horizontally through a wall).



4. As the combustion chamber empties, its pressure becomes negative, drawing in air and gas for the next ignition.

At the same instant, part of the pressure pulse is reflected back from the end of the tail pipe.



5. It re-enters the combustion chamber, causing the new gas/air mixture in the chamber to ignite and continue to cycle. Once combustion is started, it feeds upon itself, allowing the purge blower and spark igniter to be turned off.

## Fail-Safe Operation

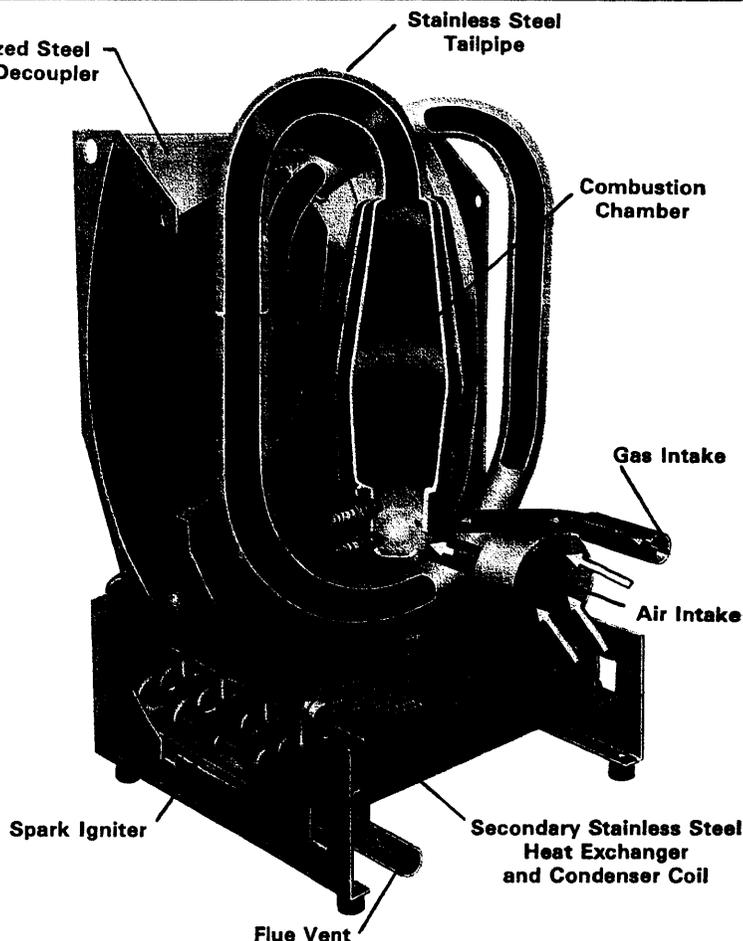
The Pulse design makes it even safer than conventional furnaces. Lockout controls shut down operation long before combustion products could ever escape.

## All Furnaces Are Not Created Equal

Most competitive high efficiency gas furnaces (above 82 AFUE) use indoor air for combustion. This can pose a potentially serious problem. All furnaces over 82 AFUE condense the water vapor found in natural gas and combustion air at least part of the time. This condensate is mildly acidic, and when chlorine-laced indoor air is used for combustion, it compounds the corrosive effect of the condensate. Such corrosive condensate can be highly damaging to your heating system. Since chlorine is a common element in most households due to degassing of chlorinated municipal water supplies, household bleaches and cleaning solvents, corrosion can appear in furnace vents, heat exchangers and other components in a relatively short period of time.

## Reliability — A Number One Pulse Priority

The Lennox Pulse furnace does not have this problem because it was designed to control condensation. For example, to avoid the indoor chlorine problem, the Pulse uses 100% outdoor air for combustion. As further protection, the Pulse utilizes a dedicated PVC vent and a stainless steel heat transfer surface that are both highly corrosion resistant. The result has been an outstanding performance record. In fact, some Pulse furnaces have been operating for five years with thousands more in operation for at least two years — all over the U.S. and Canada — without the first sign of corrosion in any of them. That's because the Pulse was developed with reliability as a number one priority.



## Warranted Heat Exchanger

The heat exchanger assembly is designed for long service life and carries a 20-year limited warranty against defects and failure.

# LENNOX

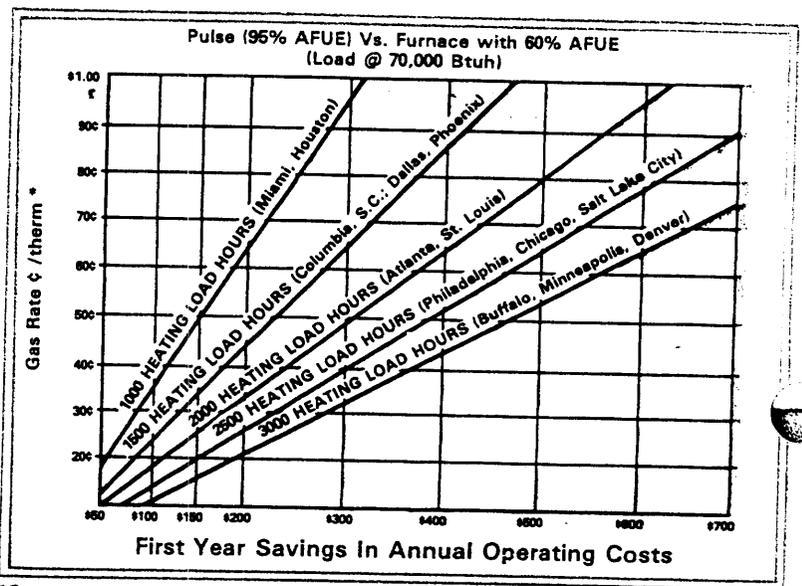
AIR CONDITIONING • HEATING

# How Much Energy Can The Pulse<sup>™</sup> Furnace Save?

Plenty. The Pulse efficiency rating is 76 % better than some gas furnace ratings listed in Department of Energy fact sheets. That means the Pulse can meet the same heating demand with about half the gas of those minimum efficiency units.

In a typical northern climate, the Pulse can pay for itself in just a few heating seasons when it replaces a low efficiency, standing pilot furnace.

The chart at the right can help you determine your approximate annual cost savings with the Pulse. Find your fuel price along the vertical column and draw a horizontal line to the diagonal that most closely represents the annual operating hours for your area. (Each diagonal is labeled with cities representative of the various climates.) Then draw a line straight down to the base to find your approximate annual savings with the Pulse versus a standard 60% efficient furnace.



\*Contact your Lennox dealer or local utility to determine your fuel cost.  
Approximate cost per therm = 100 X cost per cubic foot of gas.

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# LENNOX

AIR CONDITIONING • HEATING

G14-841-AP2 (18E77)

Outdoor Air Intake Pipe

Insulation

Heat Exchanger Assembly

Gas Valve

Air Intake, Mixing Valve & Purge Blower Assembly

Flue Pipe

Air Filter

Blower



Before purchasing this appliance, read important energy cost and efficiency information available from your retailer.



## Efficient Air Mover

The large volume blower moves air quietly over the heating surface and distributes conditioned air throughout your home. The blower motor is specially mounted to minimize vibration and sound.

## Wide Capacity Range

The Pulse is available in five up-flow models . . . 40,000, 60,000, 80,000, 100,000 and 130,000 Btuh input capacities. It can also be used with propane gas. Air conditioning can be installed with the furnace or added later.

## Easy to Service

Servicemen report that the Pulse furnace is easier to service than conventional furnaces. Simplified components and operation help keep routine maintenance costs low.

The Lennox Pulse furnace has received the first "Approved Product" award given by *The Homeowner* magazine in recognition of the Pulse's superior performance, quality and product innovation.

## Clean, Conditioned Air

An effective air filter removes dirt, dust and pollen from the air passing through it, keeping the heat exchanger clean and efficient. Standard size makes filter replacement easy.

## Sturdy Cabinet

The attractive cabinet is constructed of cold rolled steel and undergoes a six-step paint process to ensure lasting good looks. It's also designed to fit into the same space and utilize the same duct openings as most previous Lennox up-flow models for low cost installation.

34

THOMPSON & KNIGHT

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TWO ENERGY SQUARE  
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DALLAS, TEXAS 75206

DIRECT DIAL:  
(214) 969-

January 11, 1985

Mr. David W. Thome, Director  
Corrective Actions Division  
United States Consumer Product Safety Commission  
Washington, D. C. 20207

Re: CPSC ID 85-19 Lennox  
Pulse Furnace

Dear Mr. Thome:

This letter is in response to your correspondence of December 21, 1984, (which I did not receive until December 28, 1984) that states your staff has preliminarily determined the Lennox Pulse Furnace<sup>1/</sup> presents a substantial product hazard. Lennox strongly disagrees with that conclusion.

Your staff based its conclusion on the possibility a death might occur from carbon monoxide ("CO") poisoning if a Pulse Furnace, produced before February 20, 1984, was to operate in the manner previously reported by Lennox. An analysis of the problem conducted by Lennox does not support this possibility since it failed to demonstrate the CO concentration in a home with a Pulse Furnace venting through the drip leg would increase to a level that would cause death.

Lennox has conducted tests under which the highest concentration of CO in the exhaust of a Pulse Furnace, venting

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1/ Your letter seems to be addressed to all Pulse Furnaces. However, as my letter of June 27, 1984, stated, all Pulse Furnaces produced since February 20, 1984, have been equipped with cold weather kits. Therefore, any potential problem exists only with respect to a portion of all Pulse Furnaces manufactured and then only to those furnaces located in extremely cold weather areas. It is therefore, inaccurate to imply the problem as applies to all Pulse Furnaces.

Mr. David W. Thome, Director  
January 11, 1984  
Page 2

through the drip leg, is 310 parts per million.<sup>2/</sup> Using this data, and a series of highly conservative and generally unrealistic assumptions, Lennox calculated the maximum CO concentration that would be found in a home with a Pulse Furnace venting through the drip leg: The first assumption was a CO concentration in the exhaust of 400 ppm. (higher than recorded levels but at a concentration the American Gas Association sets as a standard). The second assumption was that all exhaust would vent into the house, i.e. that the flue was completely blocked. (Lennox has been unable to create in the lab a situation where the Pulse Furnace continues to run with the flue completely restricted). The third assumption was a furnace running 24-hours a day. The fourth assumption was that the infiltration rate would correspond to 1/10 of the air in the house, by volume, changing per hour (this rate is extremely low, representing a "tight" house). Applying these assumptions to a G14-80 Pulse Furnace in a 2500 square foot house, the maximum calculated concentration of CO would be approximately 192 ppm after three days of continuous operation. When realistic assumptions were made, the highest CO concentrations Lennox calculated for the house in question ranged from 4 ppm to 48 ppm, depending upon infiltration rate and percent of flue restricted, although even these figures are overstated in that they assume a furnace operating 24 hours per day. According to data reviewed by Lennox, even the highest concentration if breathed indefinitely, by someone in the house continuously, would not cause death. Depending on the time of exposure, the different calculated CO concentrations could cause headaches, dizziness and impaired judgment. These symptoms are typical of the complaints registered by individuals who may have had a Pulse Furnace venting through the drip leg.

These laboratory calculations of concentration and the conclusions reached about the potential effect of those concentrations on people, is borne out by actual experience during the winter of 1983-84, when record low temperatures and high winds were reported.<sup>3/</sup> In that period, which involved, for the most part, temperatures and winds never previously

---

2/ The American Gas Association standard for CO in the exhaust of a furnace is 400 ppm.

3/ A combination of wind and cold is critical since wind has the affect of causing more rapid heat loss for a given temperature.

Mr. David W. Thome, Director  
January 11, 1984  
Page 3

recorded and perhaps not be repeated in a generation, there were no deaths, although a few individuals did report headaches and nausea.<sup>4/</sup>

In short, the risk identified by the staff, insofar as Lennox has been able to establish, does not exist and your letter of December 21, 1984, should be rescinded.

Because no substantial product hazard exists with respect to Pulse Furnaces produced prior to February 20, 1984, Lennox is unwilling to enter into a voluntary corrective action program. Lennox has initiated and will continue its cold weather kit program. Through January 10, 1985, Lennox has received 21,760 verification forms from dealers reporting cold weather kits as installed. However, a dealer phone survey conducted in mid-November indicated verification forms were significantly lagging behind installation. For instance, in the Marshalltown division, where most of the incidents were reported, a poll of 25 dealers disclosed cold weather kits had been placed in 90% of the Pulse units those dealers had installed. In the Columbus division, which encompasses more mild winter temperature areas, the 18 dealers contacted had placed cold weather kits on 55% of the installed Pulse Furnaces. Lennox believes the cold weather kit program will be substantially completed by the end of January. The cold weather kit program continues to be a marketing response to the Pulse Furnace problem, designed to avoid loss of consumer confidence over the reliability of the product.

Lennox believes the information in this letter constitutes trade secrets or confidential proprietary information and, therefore, requests such information not be disclosed to the public pursuant to exemption D4 the Freedom of Information Act. In addition, Lennox specifically requests that this letter and the attachments not be disclosed to the public as required by Sections 6(b)(5) of the Consumer Product Safety Act.

Yours very truly,

James B. Harris

---

<sup>4/</sup> Lennox has received no reports of additional incidents this winter.

Play 72  
1-10-85

A

UNIT - G14Q3-80-2

SERIAL # 5882J04855

<u>Blockage</u>	<u>Press. Ex.</u>	<u>Rate</u>	<u>CO</u>
3/4"	.38"	83,759	.004
+1/4"	.44"	83,516	.004
+1/4"	.54"	83,261	.005
+1/4"	.67"	82,639	.004
+1/4"	1.15"	81,452	.005
+1/8"	1.30"	80,934	.005
+1/8"	1.90"	79,312	.004
+1/8"	2.40"	78,217	.005
* +1/8"	3.30"	76,551	.005
+1/8"	3.70"	74,744	.004
+1/8"	3.85"	75,003	.005
** +1/8"	4.00"	74,674	.005
* +1/8"	5.80"	73,683	.0310 200
+1/8	<u>Complete Lock-Out</u>		

\* Stopped - Recycled  
 \*\* TRAP DRY

38

May 82

B

1-11-85

UNIT - G14Q3-80-1 SERIAL # 5882E04851

<u>Blockage</u>	<u>Ex. Press.</u>	<u>Rate</u>	<u>CO</u>
	2.95"	73,292	.002
	3.30"	73,245	.002
	3.75"	72,403	.002
**	4.0"	72,979	.002
	4.5"	73,122	.002
* <u>No ignition</u> - <u>Lock-out</u>	5.8"	74,451	.002

\* Complete Block - No Ignition (Lock-out)

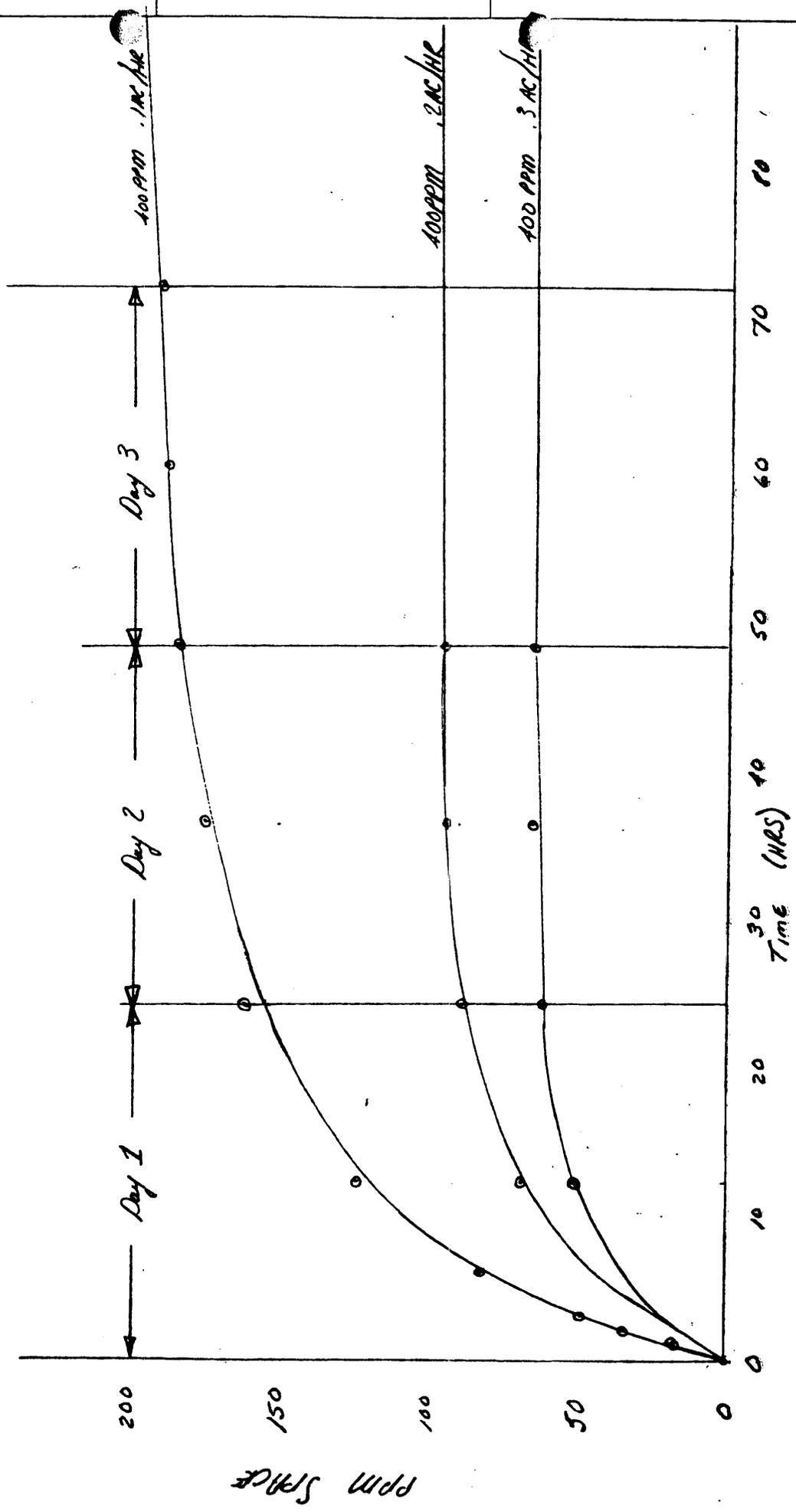
\*\* Stopped & Recycled

39

INPUT RATE (BTUH)	% FLUE TO SPACE	FLUE PROD			SPACE FINAL CO LEVEL PPM			
		% CO	PPM CO	FT3 PER MINUTE	.1 AIR CHANGE /HR	.2 AIR CHANGE /HR	.3 AIR CHANGE /HR	
80000	0	.001	10	16	0	0	0	
			NO FLUE RESTRICTION, TRAP SEALED					
80000	0	.005	50	16	0	0	0	
			94% FLUE RESTRICTION, TRAP SEALED					
80000	50	.005	50	16	12	6	4	
			94% FLUE RESTRICTION, TRAP OPEN					
80000	50	.04	400	16	96	48	32	
			94% FLUE RESTRICTION, TRAP OPEN					
80000	100	.04	400	16	192	96	64	
			100% FLUE RESTRICTION, TRAP OPEN					

- Assumptions:
- 1) G14-80 unit running 100% of the time.
  - 2) Heated space based on 2500 square feet and 8 foot ceiling (20000 cubic feet).
  - 3) 94% restriction of 2 inch PVC leaves flue opening equal to condensate drain (.5 inch diameter).
  - 4) G14 will not exceed 400 PPM CO generation prior to shutdown per the requirements of ANSI Standard Z21.64.
  - 5) Flue CO levels are air free, The volume of flue products is based on 12 ft<sup>3</sup> of flue products per ft<sup>3</sup> of gas burned.

SPACE CO LEVEL VS TIME IN HOURS  
 (100% FLUE RESTRICTION, TRAP OPEN)



7

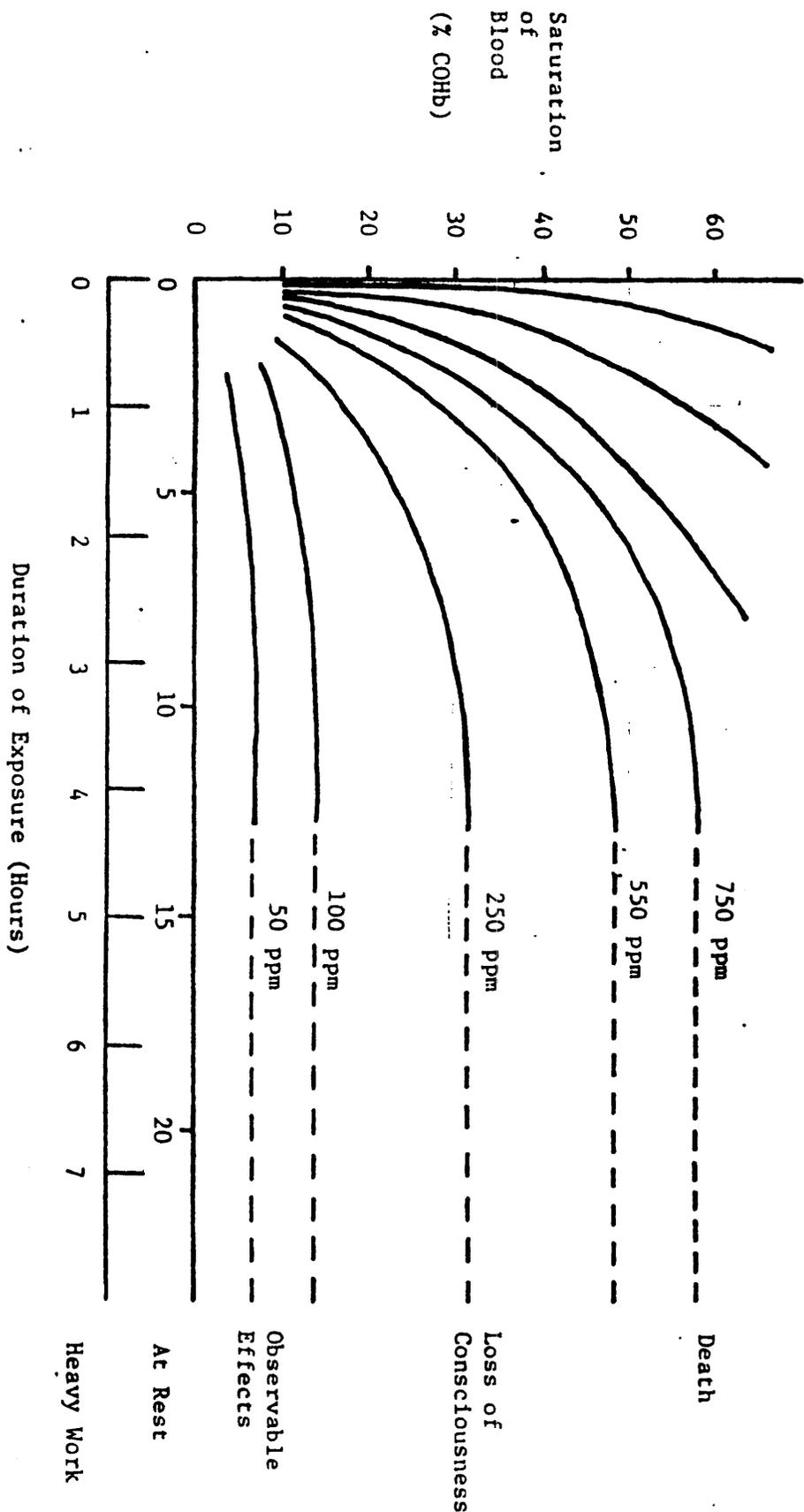


Figure 1-1. Physiological Effects on the Human Body Caused by CO.

Source: National Academy of Sciences

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## Chapter 6

# Determination of Carbon Monoxide in Minute Concentrations

by C. W. Wilson

### INTRODUCTION

Carbon monoxide is a colorless, almost odorless, highly toxic, nonirritating gas. Although a normal constituent (1 to 25 per cent) of many manufactured gases, CO does not occur in natural gas. It may be formed by incomplete combustion of any fuel containing carbon in the solid, liquid, or gaseous state, in which case it would exist with other gases in the products of combustion. Some gases, such as aldehydes and alcohols, which often accompany CO formation, are very odorous. If combustion is complete, no trace of CO will be present. However, very small CO quantities are permitted under the American Standard Approval Requirements for most gas appliances without being judged "incomplete" combustion. Instruments and methods of test used for detection of CO must be capable of making analysis accurate to hundredths or thousandths of one per cent.

#### Maximum Allowable Concentration of Carbon Monoxide in Air Breathed

Carbon monoxide can enter the body only thru the respiratory system. It acts as an asphyxiant<sup>1,2</sup> by combining with

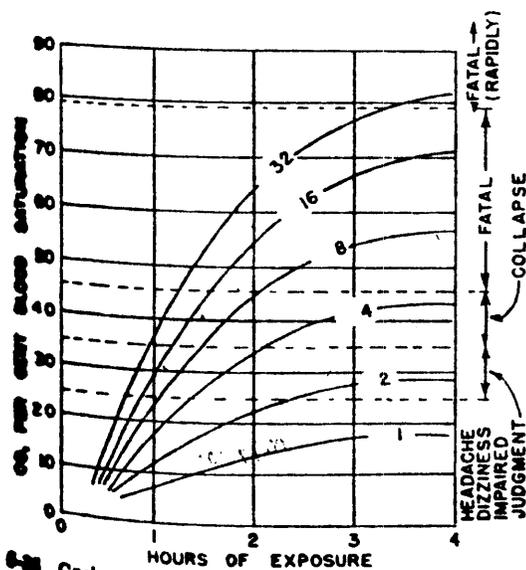


Fig. 6-24 Carbon monoxide absorption by human blood.<sup>3</sup> Curves indicate parts of CO in 10,000 parts of air, i.e., hundredths of one per cent.

the hemoglobin of the blood to exclude oxygen. This combination is more stable than that of hemoglobin with oxygen, and affinity of CO for hemoglobin is much greater than that of oxygen. It is estimated that one part of CO in the blood stream requires 210 parts of oxygen to replace it.

If a person is exposed to carbon monoxide, the amount absorbed in his blood will depend upon several factors. These include the CO concentration in the air, time of exposure, number and length of periods of breathing fresh air between exposures, subject's degree of physical activity, and his physical health.

Table 6-4 lists effects of various percentages of CO in air on human beings. Figure 6-24 shows the effects of exposure time on per cent of blood saturation and on resulting physical impairment.

Table 6-4 Physiological Effect of Carbon Monoxide<sup>3</sup>

CO concentration in air		Effects
Parts per million	Per cent	
100	0.01	Concentration allowable for several hours exposure. Dept. of Labor, New York State Health Bulletin, 1930, states that this concentration can be tolerated indefinitely. (See * footnote to Table 1-30.)
400 to 500	0.04 to 0.05	Concentration which can be inhaled for one hour without appreciable effect.
600 to 700	0.06 to 0.07	Concentration causing barely appreciable effect after 1 hr exposure.
1000 to 1200	0.10 to 0.12	Concentration causing unpleasant but not dangerous symptoms after 1 hr exposure.
4000 and over	0.40 and over	Fatal concentration in exposures less than 1 hr.

All gas appliances tested for compliance with American Standard Approval Requirements and bearing the Approval Seal of the American Gas Association have met very rigid tests for combustion, together with many other safety tests. For example, for domestic gas ranges<sup>4</sup> the following requirement applies:

7 MAR 1985

James T. Harris, Esquire  
Thompson & Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, Texas 75201

RE: CPSC ID 85-19  
Lennox Pulse Furnace

Dear Mr. Harris:

This responds to your letter of January 11, 1985. In your letter you provided us with test data indicating it was virtually impossible for concentrations of carbon monoxide released in a residence served by a Pulse furnace to cause death under the conditions reported by Lennox for the furnace.

Review of the test data by the Commission's Health Sciences staff indicates that death from carbon monoxide poisoning could occur if there is a very low air exchange rate in the home served by the Pulse furnace and other conditions such as the victim's health and length of time of exposure are factors. A copy of the Health Sciences memorandum is enclosed.

As you can see, the Health Sciences memorandum reinforces the Commission staff's finding that the severity of injury occurring from carbon monoxide released in a residence served by the furnace could be serious and because it is unknown what cold weather conditions could occur in the future, a risk of injury including death could be manifested in future incidents.

We again renew our request for the submission of a voluntary corrective action plan as outlined in our letter to you of December 21, 1984.

In addition, please provide information to us on the two additional incidents you reported in a telephone conversation with Mervin Everhart on February 6, 1985.

CACA:M Everhart:dt:3/6/85

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If you have any questions, please contact Marvin Everhart, telephone 301/492-6609.

If Lemmon elects to submit a written corrective action plan, please inform us of this fact within 10 working days from receipt of this letter and submit a written plan thereafter as soon as possible.

Sincerely,

David W. Thome  
Director, Corrective  
Actions Division

Certified Mail

cc: Southwestern Regional Office

45

THOMPSON & KNIGHT

ATTORNEYS AND COUNSELORS

3300 FIRST CITY CENTER

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(214) 969-1102

March 26, 1985

FEDERAL EXPRESS

Mr. David W. Thome, Director  
Corrective Actions Division  
Directorate for Compliance and  
Administrative Litigation  
U. S. Consumer Product Safety Commission  
Washington, D. C. 20207

Re: CPSC Id. 85-19  
Lennox Pulse Furnace

Dear Mr. Thome:

On Monday, March 18, 1985, I received a copy of a memorandum from W. K. Porter, Director, HSHL, discussing the relationship of effects associated with exposure to various concentrations of carbon monoxide to problems Lennox has reported to the CPSC concerning its Pulse Furnace. I have a number of serious reservations about Mr. Porter's memorandum that I would like to share with you.

The memo seems to imply that the 22 incidents of exhaust line blockage, apparently followed by venting of exhaust gas through the dripleg of the furnace, occurred only in homes tightly insulated, and that there must be numerous other incidents occurring in the field that are not being reported because they are not occurring in "tight homes". That conclusion is simply incorrect. The 22 incidents Lennox has reported are all of the incidents that have been brought to the company's attention, regardless of whether any person has complained of feeling ill. As my September 5, 1984, letter to you pointed out, of the 20 incidents then reported, seven involved confirmed cases of people feeling ill and for another five, we had sketchy information indicating people may have felt ill. Of the latest two incidents, which are described on the attached Exhibit "A", only one involved complaints of physical discomfort. In short, of the 22 reported incidents, 10 so far as we are aware, have not involved any claim of illness or nausea. This information supports Lennox' conclusion that its dealer system is providing information on all exhaust blockage problems, whether or not they include any claims of physical

Mr. David W. Thome  
March 26, 1985  
Page Two

discomfort. Therefore, the conclusion that "the fact that large numbers of complaints were not received indicates that the majority of furnace installations did not cause discomfort or symptoms of CO exposure to become apparent or recognized and reported" is simply incorrect. The reason large numbers of reports have not been received is because there have not been a large number of incidents. Lennox reasonably believes that all incidents that have occurred have been reported. In the same fashion, Mr. Porter's assumption that the reported "incidents occurred in the low filtration rate subset of the houses where Lennox furnaces were installed" is both incorrect and unsupported.

Moreover, Lennox also disagrees there is any risk of death associated with the reported problem, and believes Table 2 attached to the memo does not support such a conclusion. As I understand Table 2, the lowest reported COHB level causing a death was 26 percent, which occurred in a 50 year old victim with a blood alcohol content of 0.12 percent.<sup>1</sup> In reviewing the chart submitted by Lennox depicting physiological effects on the human body caused by CO, from the National Academy of Sciences, it is clear that continuous exposure to 192 ppm of CO, which is the highest concentration of CO that could be achieved in a home with a furnace venting through the dripleg (assuming a series of highly conservative and generally unrealistic assumptions), results in a COHB level of approximately 28 to 29 percent. This level is below the COHB percentage at which the CPSC has reported deaths from individuals with heart or circulatory problems.

At most, the memo from Mr. Porter indicates that a person who lives in a tightly insulated home (2 to 10 percent of the housing stock), in a cold weather area (some subset of the 2 to 10 percent), who owns a Lennox furnace (a further subset of the previous two groups), who experiences record setting cold weather (a further subset of the previous three groups), who has an exhaust blockage problem (again, an extremely small subset of all Lennox furnaces), and has had several drinks, may face the possibility of death if all of these factors come together. I find it difficult to believe that the staff of the CPSC or the CPSC seriously contend that this situation constitutes a substantial product hazard.

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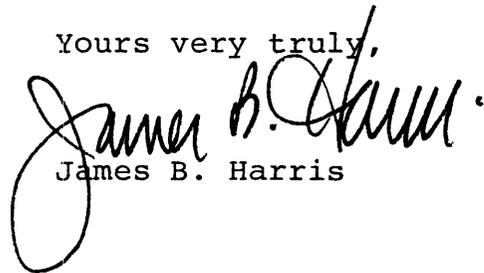
<sup>1</sup>No other information is provided about this incident making it difficult to determine how much of an aberration it was.

Mr. David W. Thome  
March 26, 1985  
Page Three

Mr. Porter's memo simply does not support a contention that a substantial product hazard exists, and Lennox continues to disagree strongly with the staff conclusion. Lennox, therefore, continues to be unwilling to enter into a voluntary corrective action program. Lennox is continuing its cold weather kit program, and will provide an update on the success of this program next week.

Lennox believes the information in this letter constitutes trade secrets or confidential proprietary information and, therefore, requests such information not be disclosed to the public pursuant to Exemption D4 of the Freedom of Information Act. In addition, Lennox specifically requests that this letter not be disclosed to the public as required by § 6(b)(5) of the Consumer Product Safety Act.

Yours very truly,

A handwritten signature in cursive script that reads "James B. Harris". The signature is written in black ink and is positioned above the printed name.

James B. Harris

JBH/JB  
Encls.

EXHIBIT "A"

<u>NUMBER</u>	<u>DATE</u>	<u>LOCATION</u>	<u>MODEL NUMBER</u>	<u>SERIAL NUMBER</u>	<u>APPROXIMATE MANUFACTURE DATE</u>
21	1/20/85	Sturgeon Bay, WI	G14-Q360-60	5883D07165	
22	1/19/85	Aitkin, MN	G14-Q3-60-1	5883D000625	

30 APR 1985

James B. Harris  
Thompson & Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, Texas 75201

RE: CPSC ID 85-19  
Lennox Pulse Furnace

Dear Mr. Harris:

Thank you for your letter of March 26, 1985, in which you expressed your reservations to a memorandum by W.K. Porter, Director, Division of Health Sciences Laboratory. We will respond to you when we complete our review of this matter.

In the interim, please send me as complete information on all of the reported incidents to date (22) as you have. This should include names, addresses and telephone numbers of complainants, copies of complaints, and any other data related to these particular incidents.

If you have any questions, please contact me, Larry L. Hershman, telephone: (301) 492-6608, since I have been assigned this file in Marvin Everhart's absence.

Sincerely,

Larry L. Hershman  
Division of Corrective Actions  
Directorate for Compliance and  
Administrative Litigation

JUL 26 1985

Mr. James B. Harris, Esquire  
Thompson and Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, TX 75201

RE: CPSC ID 85-19  
Lennox Pulse Furnance

Dear Mr. Harris:

In a letter to you dated December 21, 1984, we notified you that the Commission staff had made a preliminary determination that the Lennox Pulse furnace presents a "substantial product hazard", as that term is defined in Section 15 of the Consumer Product Safety Act.

The staff has concluded that under certain conditions, exhaust carbon monoxide gas could exit through the drip leg of the furnace and be released into the residence. This occurred during extremely cold and windy weather conditions when the low temperature exhaust gas passed through an uninsulated exhaust vent, and the exhaust gas condensate froze, partially blocking the exhaust vent.

Lennox has disputed the contention of the Commission staff that death or serious illness could result from carbon monoxide poisoning caused by the pulse furnace if certain conditions are present, such as a very low air exchange rate in the house served by the furnace and if other variables, such as the health of people in the house and length of exposure, are factored in.

Lennox has developed a cold weather kit to retrofit Pulse furnaces found in northern parts of the United States. Lennox is also equipping all new Pulse furnaces with this kit.

Because of your disagreement with the staff's finding of a substantial product hazard, you have refused to submit a written corrective action plan describing the actions Lennox has taken to correct the problem. On the other hand, the staff has again reviewed the file on this matter, and stands firmly behind its original finding.

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Since we approve and endorse your modification of the furnaces, and because you have notified us that you have corrected 96% of the affected units in service and are continuing to correct such units, we see no need to take further action at this time to seek additional corrective actions. We request that Lennox continue its modification of its Pulse furnaces and reporting its progress to the staff. Such actions by Lennox would provide the greatest measure of protection to consumers.

We also request once again that you provide us with copies of your reports on the incidents which have occurred. We are willing to forgo receiving the names of the consumers at this time. Please refer to 16 CFR Section 1115 for the staff's regulatory authority to request this information.

If you have any questions, please contact Lawrence Hershman, at (301) 492-6608. We would appreciate a response within 10 working days.

Sincerely,

David W. Thome, Director  
Corrective Actions Division

Certified Mail

THOMPSON & KNIGHT

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DIRECT DIAL  
(214) 969-1102

August 12, 1985

Mr. David W. Thome, Director  
Corrective Actions Division  
U.S. Consumer Product Safety Commission  
Washington, D. C. 20207

Re: CPSC ID 85-19  
Lennox Pulse Furnace

Dear Mr. Thome:

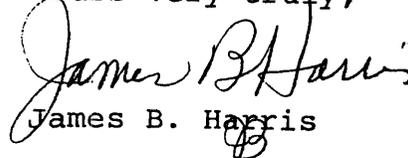
Thank you for your letter dated July 26, 1985, which I received on July 29, 1985.

In that letter you requested that we provide the CPSC with copies of any reports we may have on the incidents that occurred. As I have previously mentioned to the staff, most of the information involving the incidents was transmitted orally. Nevertheless, we are reviewing our files to see what reports we have that could be provided to you.

That review has been slowed somewhat by the fact that the in-house counsel for Lennox with control of those files has been on vacation for the last week. In addition, I will be on vacation from August 11 through August 18, 1985.

I would hope to provide you with any relevant documents that we have no later than August 30, 1985.

Yours very truly,

  
James B. Harris

JBH/JB

copy: Mr. Richard Guthrie

(Dictated but not read)

APR 09 1986

Mr. Richard Guthrie, Esquire  
Lennox Industries Inc.  
Lennox Center  
P. O. Box 809000  
Dallas, Texas 75380-9000

Re: CPSC ID 85-19  
Lennox Pulse Furnace

Dear Mr. Guthrie:

Quite some time has passed since I contacted you and James B. Harris for information on the 22 reported incidents involving Lennox Pulse Furnaces.

In my July 26, 1985, letter to Mr. Harris, I stated that the Commission staff was willing to forgo receiving the names of the consumers involved, and I also reiterated the staff's regulatory authority to request this information.

In telephone conversations since that letter, Mr. Harris has assured me of the pending transmittal of that information. Perhaps, there has been a mix-up of communications, but I have not yet received the incident data in Lennox files. It was my understanding that you had possession of this information.

Also, please provide the latest information on the progress of Lennox' program to retrofit the 65,000 furnaces with cold weather kits. Provide the total number of these units that have been so serviced.

I would appreciate a response within 10 business days. Lennox' cooperation in this matter will facilitate and perhaps enable us to complete our investigation, and not require us to resort to more formal legal options to carry out our mandate.

Sincerely,

Lawrence L. Hershman  
Compliance Officer  
Division of Corrective Actions

cc: SWRO  
James B. Harris, Esq.  
Thompson & Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, Texas 75201

Mr. James B. Harris, Esquire  
Thompson and Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, Texas 75201

RE: CPSC ID 85-19  
Lennox Industries, Inc.  
Lennox Pulse Furnaces

Dear Mr. Harris:

The Commission staff has reviewed Lennox's corrective action and acting under delegation from the Commission, has accepted the action as adequate.

Since you have already begun to implement your corrective action, please continue. The Commission's Southwestern Regional Office will be monitoring your firm's corrective action program. Please submit progress reports of your recall to Claude Tolbert of the Southwestern Regional Office at the address listed below with a copy to this Division.

The Commission staff will be evaluating the effectiveness of your action. Broader corrective action could be sought from you if the corrective action does not prove effective.

If you receive any information concerning other incidents or injuries or affecting the scope, prevalence or seriousness of the defect or hazard, you should report to this Division. Additionally, if you receive information which might indicate that your corrective actions are not satisfactory in eliminating the defect or hazard or that the effectiveness of the corrective action program is less than has been anticipated, you should supply this information to this Division.

When you feel the corrective action has been implemented to the best of your ability, please submit a final progress report and request that the file be closed. At that time the degree of your progress will be reviewed and this office will decide whether or not the file should be closed.

UNITED STATES CONSUMER PRODUCT SAFETY COMMISSION  
WASHINGTON, D.C. 20207

Page 2

We are enclosing a summary of Lennox's corrective action program. The Commission will include this summary in a monthly list of recalls and other corrective actions which is released to the public and in the annual report that the Commission publishes every fall. This letter is your opportunity under section 6(b)(1) of the Consumer Product Safety Act (CPSA), 15 U.S.C. §2055 (b)(1), to comment on the accuracy of the summary. Section 6(b)(1) requires the Commission to give notice thirty days in advance of the intended disclosure of information that identifies the manufacturer or private labeler of a product.

We have made every effort to assure that the summary is accurate. If however, you believe that the summary is not accurate, please send comments to Judith Hayes, Corrective Actions Division, Room 240, Consumer Product Safety Commission, Washington, D.C. 20816 so that your comments are received within twenty-three calendar days of your receipt of this certified letter. Please include with your comments specific information to support your claim that the summary is not accurate. If the Commission determines that it may disclose the summary, unchanged, over your objections, we will give you ten days notice, as required by section 6(b)(2) of the CPSA, 15 U.S.C. §2055 (b)(2).

If you have any questions, please contact either Claude Tolbert on (214) 767-0841 or Lawrence L. Hershman on (301) 492-6608.

Sincerely,

David W. Thome, Director  
Corrective Actions Division  
Compliance and Administrative  
Litigation

Enclosure

Certified Mail

cc: Claude Tolbert  
Southwestern Regional Office  
1100 Commerce Street  
Room 1 C 10  
Dallas, TX 75242

bcc: Judith Hayes, CACA

57

THOMPSON & KNIGHT

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DALLAS, TEXAS 75201

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DALLAS, TEXAS 75206

DIRECT DIAL:  
(214) 969-

December 9, 1986

Ms. Judith Hayes  
Corrective Actions Division  
Room 240  
U.S. Consumer Product Safety Commission  
Washington, D.C. 20816

RE: CPSC ID 85-19  
Lennox Industries, Inc.  
Lennox Pulse Furnaces

Dear Ms. Hayes:

In a letter from Mr. David Thome, dated November 13, 1986, and received by me on November 17, 1986, Lennox Industries, Inc., was provided twenty-three days in which to comment on the accuracy of a summary of a Lennox "Corrective Action Program." As discussed below, Lennox has a number of concerns with respect to the accuracy of that summary and is requesting certain modifications.

Under the heading "Alleged Hazard," the first sentence reads: "In extremely cold weather, the exhaust vent on these furnaces may partially freeze over, forcing exhaust gases into the residence." In fact, exhaust gases are forced into the furnace before entering the residence and only for a limited period of time prior to furnace shutdown. Therefore, we would request the first sentence be revised to read as follows: "In extremely cold weather, the exhaust vent on these furnaces may partially freeze over, forcing exhaust gases into the furnace, and then into the residence, before the furnace shuts down." The second sentence currently reads: "This could present a danger of carbon-monoxide poisoning." Based on information previously discussed with the staff, we believe the term "poisoning" overstates the effect of exhaust gases entering the residence through the furnace for a short period of time. Therefore, we suggest that the second sentence be rewritten to read as follows: "This could present a danger of elevated carbon-monoxide levels, prior to shutdown."

Lennox also has concerns about the accuracy of certain statements in the narrative under the heading "Remedy." The

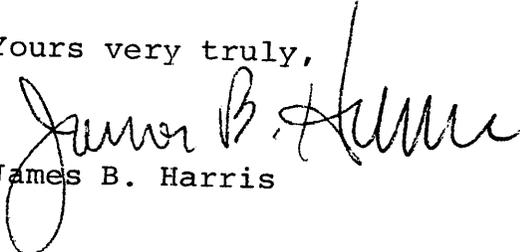
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THOMPSON & KNIGHT  
Ms. Judith Hayes  
December 9, 1986  
Page Two

first sentence currently reads: "Lennox developed a cold weather kit that prevents the exhaust from freezing and blocking the exhaust vent." In fact, the cold weather kit does not prevent freezing, rather it assures prompt shutdown in the event that condition occurs. Therefore, we would suggest that the sentence be rewritten as follows: "Lennox developed a cold weather kit that assures prompt shutdown if the exhaust vent is frozen over." The third sentence suggests that the cold weather kit was incorporated into new production. In fact, the kit itself was not incorporated, rather design and component changes included in the cold weather kit became part of the furnace design. Therefore, we would suggest the third sentence be rewritten to read as follows: "Lennox has incorporated the kit changes into new production since February 1984."

If you should have any questions about any of these proposed changes or require additional information, please do not hesitate to contact me.

Yours very truly,

  
James B. Harris

JBH:esh



U.S. CONSUMER PRODUCT SAFETY COMMISSION  
SOUTHWESTERN REGIONAL OFFICE

1100 COMMERCE STREET, ROOM 1C10 • DALLAS, TEXAS 75242 • 214-787-0841

ARKANSAS  
COLORADO  
KANSAS  
LOUISIANA  
MISSOURI  
NEW MEXICO  
OKLAHOMA  
TEXAS

January 8, 1987

Mr. James B. Harris, Esquire  
THOMPSON & KNIGHT  
3300 First City Center  
1700 Pacific Avenue  
Dallas, Texas 75201

Re: CPSC ID #85-19  
Lennox Industries, Inc.  
Lennox Pulse Furnaces

Dear Mr. Harris:

The Southwestern Regional Office of the Consumer Product Safety Commission has the responsibility of monitoring the corrective action being taken by Lennox Industries, Inc. with respect to the correction of carbon monoxide problems with their Pulse Gas Furnaces. This letter is to notify you of the need for monthly status reports commencing on January 26, 1987. Each month a report should be filed with this office that informs the Commission of the progress of Lennox' corrective action plan. The report should indicate the number of units that have been corrected and the figures should be updated as new information becomes available.

Enclosed is a sheet that indicates the preferred format for these status reports. When the information is provided to us in this way, we will be able to gauge how successfully your plan is progressing. We understand that this form may not be entirely suitable to the structure of Lennox' distribution chain; therefore, feel free to adapt the form to your specific means. In general, however, your submitted report should conform as nearly as possible to this format. If you have previously made a confidentiality claim for any of these figures, please note this on each monthly report.

In order to assist us with our monitoring efforts, we request that you submit along with the above monthly status report the following information:

1. A list of dealers that received your Cold Weather Retrofit Kits; and,
2. Summary information on the 22 reported incidents involving the Lennox Pulse Furnaces referenced above.

THOMPSON & KNIGHT

Mr. James B. Harris, Esquire, cont'd.

Re: Lennox Industries, Inc. Pulse Gas Furnaces, ID #85-19

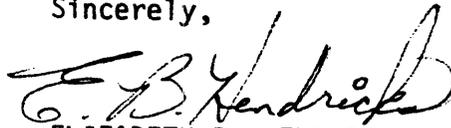
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When you reach the conclusion that the Lennox corrective action plan is complete, submit your usual monthly report including a summary of your progress to date and an explanation of your reasons for requesting a close-out of the file at that time. Please identify this as your "Final Report". At that time, this office will initiate procedures for the close-out of your file.

If you have further questions regarding this matter, please contact my Senior Compliance Officer, Claude E. Tolbert, at (214) 767-0841.

Please see the attached Fact Sheet regarding confidentiality.

Sincerely,



ELIZABETH B. HENDRICKS  
Regional Director  
Southwestern Regional Office

encl.

CERTIFIED MAIL #P 070 536 339  
RETURN RECEIPT REQUESTED

bcc: DAL OPS  
DAL COMP  
CAC (Attn: Larry Hershman)

## THOMPSON &amp; KNIGHT

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March 6, 1987

Mr. Claude E. Tolbert  
Senior Compliance Officer  
U. S. Consumer Product Safety  
Commission  
Southwestern Regional Office  
1100 Commerce Street  
Room 1/C/10  
Dallas, Texas 75242Re: CPSC I.D. No.85-19  
Lennox Industries, Inc.  
Lennox Pulse Furnaces

Dear Mr. Tolbert:

I was some what surprised at the letter from Elizabeth Hendricks asking that Lennox report certain information on a "corrective action" program being undertaken by the company. Lennox has never agreed to undertake any such "corrective action" since it does not believe that any substantial product hazard exists with respect to the Lennox Pulse Furnace.

However, in an effort to be responsive to your request, please be advised on behalf of Lennox that we consider our cold weather kit program completed at this point. The total number of units involved in the program was 70,570 and as of December 12, 1986, the company had received completed verification forms from dealers indicating 65,048 of those units had been fitted with the kit. For some time the company has not received verification forms and it believes that dealers have reached as many of the units as is reasonably possible.

You should also note that some of the units included in the 70,570 initially targeted for the program were installed in areas that do not have extreme cold weather, and we believe that in those situations the dealers were probably reluctant to seek to install the kits.

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THOMPSON & KNIGHT

Claude E. Tolbert

March 6, 1987

Page Two

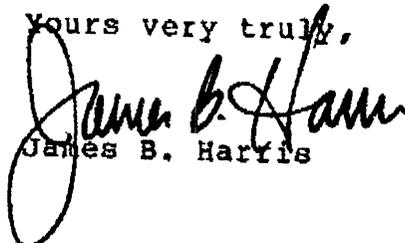
In Ms. Hendricks' letter, she requested a list of dealers that received the cold weather kits. Lennox does not understand why you want this information since the retrofit program has been concluded. The locations of dealers who would receive the kits was discussed with headquarters and verification cards exist documenting the kits were installed.

Ms. Hendricks also requested summary information on the 22 reported incidents involving Lennox Pulse Furnace. Information on reported incidents has previously been supplied to the headquarters office of the Consumer Product Safety Commission.

Lennox considers all of the information in this letter to be confidential and proprietary and believes such information is protected from disclosure under both the FOIA and the CPSCA. In particular, any release of the number of units targeted for kits would hurt the company's competitive position.

If you should have any questions, please do not hesitate to contact me.

Yours very truly,

  
James B. Harris

JBH:esh

cc: Richard Guthrie

*Please call me to  
discuss appropriate  
F/U on this case*

RESTRICTED

COPY

JAN 15 1988

James B. Harris, Esquire  
Thompson & Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, TX 75201

RE: CPSC ID85-19  
Lennox Industries, Inc.  
Lennox Pulse Furnaces

Dear Mr. Harris:

In our telephone conversation on January 12, 1988, you expressed reservations about Commission employees contacting consumers to verify the cold-weather retrofit of their Pulse furnaces. As I told you in our conversation, I was unfamiliar with the mechanics of such monitoring since the Commission's field staff always handles such tasks.

I checked on the Commission's policy regarding the monitoring of corrective actions taken by firms where the Commission staff has made a preliminary determination that the subject product presents a substantial product hazard.

It has been longstanding Commission policy that Commission staff performs such monitoring. Monitoring by third parties is not acceptable.

Your letter of March 6, 1987 to Claude Tolbert of the Commission's Dallas office characterized your program as being very successful. Random effectiveness checks, as selected by Mr. Zannie Weaver of the Commission's Dallas office, should easily verify this. As is standard for Commission recall monitoring, Commission staff will contact between 10 and 20 dealers and one or two consumers per dealer. The staff's inquiries will be short and direct, to the effect of, "Were you contacted about the cold-weather kit, and was your furnace then retrofitted?"

Mr. Weaver (telephone 214-729-0841) will contact you soon to make arrangements for conducting the monitoring. We require access to the completed verification forms and direct access to Lennox' dealers and consumers for our monitoring effort.

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James B. Harris, Esquire  
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Recent bitterly cold weather across much of the United States, with wind chill temperatures reaching minus 60 degrees Fahrenheit, presents conditions that caused the problems that led the Commission staff to find that Lennox Pulse Furnaces present a substantial product hazard.

If the staff cannot adequately satisfy itself, with Lennox' full cooperation, that the Lennox cold weather retrofit program has been successfully carried out, the staff will have to pursue a more aggressive and active strategy to verify that no further corrective action is warranted. Such actions could include, but not be limited to, seeking compulsory process, such as a subpoena or special order, or going through the telephone book and contacting a number of Lennox dealers and their customers independently.

Sincerely,

Lawrence L. Hershman  
Compliance Officer  
Division of Corrective Actions

cc: Richard Guthrie, Esquire  
Lennox Industries, Inc.  
Lennox Center  
P.O. Box 8090000  
Dallas, TX 75380-9000

Claude E. Tolbert ✓  
Dallas Satellite Office  
U.S. Consumer Product Safety Commission  
1100 Commerce Street, Rm. 1C10  
Dallas, TX 75242

Zannie E. Weaver  
Dallas Satellite Office  
U.S. Consumer Product Safety Commission  
1100 Commerce Street, Rm. 1C10  
Dallas, TX 75242

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JUN 21 1989

James B. Harris, Esquire  
Thompson & Knight  
3300 First City Center  
1700 Pacific Avenue  
Dallas, TX 75201

RE: CPSC ID 85-19  
Lennox Industries, Inc.  
Lennox Pulse Furnace

Dear Mr. Harris:

The U.S. Consumer Product Safety Commission staff has reviewed the progress of the corrective action taken by Lennox with regard to the above investigation. Previously, the staff had approved Lennox' corrective action after finding, despite Lennox' objections, that the subject furnaces presented a substantial product hazard.

The Division of Corrective Actions has determined that no further monitoring on the part of the Commission is warranted. Therefore, acting under delegation from the Commission, the staff has closed this investigation. The Commission staff, however, will reopen this file if it finds that the public has not been adequately protected from the risk of injury presented by this product by the corrective action taken by the firm.

Lennox has a continuing obligation to inform the Commission of defects associated with this product which could create a substantial product hazard. If Lennox receives any information affecting the scope, prevalence, or seriousness of the problem or hazard, Lennox must report to this Division.

We request that the company continue to supply cold-weather kits until as many furnaces as possible have been retrofitted. If Lennox receives information which might indicate that its actions are not satisfactory in eliminating the hazard or that the effectiveness of Lennox' corrective action was less than what had been reported, please supply that information to the Division of Corrective Actions.

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The Division thanks Lennox for its cooperation with the Commission's field representatives who visited Lennox' ~~three~~ regional centers.

Sincerely yours,

Carlos L. Perez, Director  
Division of Corrective Actions  
Directorate for Compliance and  
Administrative Litigation.

Certified Mail

cc: Richard Guthrie, Esquire  
Lennox Industries, Inc.  
Lennox Center  
P.O. Box 8090000  
Dallas, TX 75380-9000

CPSC Dallas Satellite Office  
1100 Commerce Street, Rm. 1C10  
Dallas, TX 75242

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MEMO RECORD	AVOID ERRORS PUT IT IN WRITING	DATE 7-11-84
FROM: Roy Deppa		OFFICE ES
TO: Marvin Everhart		DIVISION CA
SUBJECT: Lennox Pulse Furnace Freeze Up Problem with Vent Pipe		
SUMMARY  <p>The product is a gas furnace of the pulsed recuperative heat exchanger type. The reported problem was one of the exhaust vents freezing partially shut during unusually cold weather allowing exhaust gases to be vented into the building. I have asked Tom Cooper, ESES, to examine this file in response to your request for what information we might want to ask the firm. His request follows:</p> <ol style="list-style-type: none"> <li>1. Provide a technical explanation of the process which caused the furnaces to shut off after the exhaust vents froze partially shut.</li> <li>2. Provide a diagram showing typical installation with and without the newly added 1/2 inch vent pipe and 3/16 inch restrictor.</li> <li>3. Provide test data demonstrating the effectiveness of the fix.</li> </ol>		
SIGNATURE 	DOCUMENT NUMBER	