

**CONSUMER
GUIDE TO
VENT-FREE GAS
SUPPLEMENTAL
HEATING
PRODUCTS**

| Energy-Smart Decisions |



\$ensible Heat[®]



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VENT-FREE: WHAT IT IS AND HOW IT WORKS

It's a warm, safe, and simple answer to your supplemental zone or home heating needs.

A vent-free gas heating appliance operates without a chimney, flue or vent, so you can install a system just about anywhere without making a hole in the wall or roof.

Vent-free gas products include space heaters, stoves, fireplaces, fireplace inserts, and gas logs. Modern vent-free gas heating appliances:

- are affordable to buy and provide heat for pennies per hour;
- deliver a remarkable 99.9% energy efficiency;
- provide reliable warmth during power failures;
- add aesthetic beauty and value to a home;
- are design-certified by national testing laboratories to the latest national safety standards (ANSI Z21.11.2);
- meet today's most rigorous air-quality recommendations; and
- can be purchased for use with either natural gas or propane.

Millions of American homes — and tens of millions of households worldwide — already enjoy the comfort and convenience of vent-free gas heating products. In fact, Americans buy more vent-free gas appliances than any other type of supplemental gas heating product.

HOW IT WORKS

A vent-free room heater, fireplace, log set, or stove is permanently connected to a line fueled by natural gas or propane. Most require no electricity, making them ideal for keeping your family warm during a power outage.

INDOOR AIR QUALITY

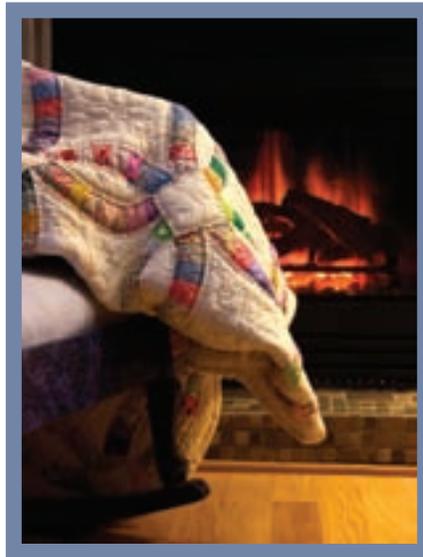
Combustion byproducts that can affect indoor air quality include carbon monoxide, carbon dioxide, nitrogen dioxide, oxygen, and water vapor.

Research test results proved that vent-free gas heating products meet or exceed current and applicable nationally recognized standards and recommendations for indoor air quality for all five of these byproducts.

These low emission levels are confirmed by independent American Gas Association Research testing (*see page 17*).

INDOOR RELATIVE HUMIDITY

Independent research testing has also proven that, for the vast majority of homes in the U.S., vent-free gas heating products DO NOT generate enough water vapor to raise indoor humidity levels high enough to foster mold growth. The findings of this independent research testing are on pages 16-17.



AN OUTSTANDING SAFETY RECORD

Vent-free gas heating appliances have compiled an outstanding safety record in millions of American homes. That's because, since 1980, vent-free gas products have been equipped with a unique safety pilot system called an Oxygen Detection Safety-Pilot, or ODS.

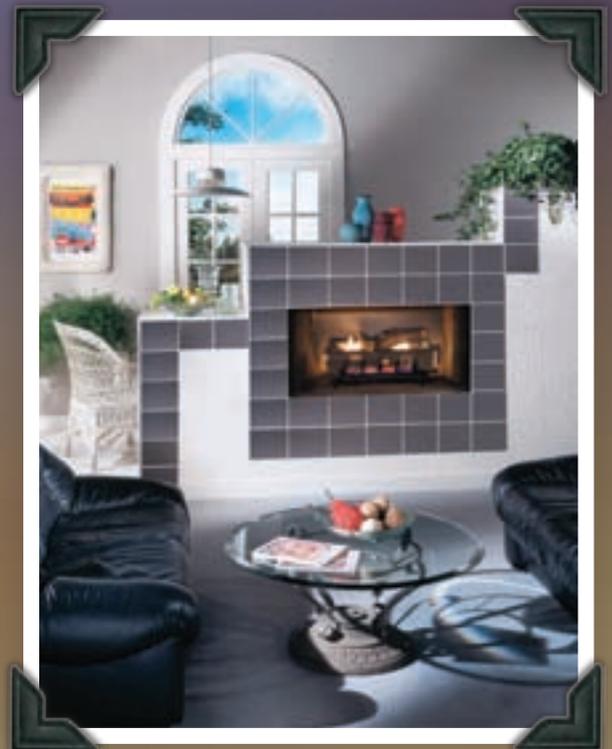
The ODS continuously monitors the oxygen level in the room. If the ODS detects a reduced level of oxygen (approaching 18%), the ODS automatically shuts off the gas supply, extinguishing the flame. (Many factors in a home can cause the oxygen level to be reduced.) The ODS will not allow the heater to operate unless the room is properly ventilated with adequate oxygen. For complete details on the safety and reliability of vent-free gas products, see pages 10-11.



“The Vent-Free Gas Products Alliance has teamed up with the nonprofit Home Safety Council to support fire and life safety educators in local fire departments across America. Through Home Safety Council’s Expert Network of more than 5,000 safety advocates, the partnership supports delivery of accurate home safety information, including important tips for safe home heating.”

— Sue Walker
Chairman of the Vent-Free Alliance
“Proud Supporter of the Home Safety Council”





**A
HEATING
APPLIANCE
FOR EVERY
NEED**

*Choose from a variety of vent-free gas heating appliances.
One is sure to meet your needs.*

Whether you're interested in a simple space heater for a room addition or basement workshop, or a luxurious fireplace for the corner of your formal dining room, there's a vent-free gas product to meet your needs. No matter what type of vent-free gas heating appliance you're interested in, all of these products:

- are energy efficient;
- are convenient;
- heat for pennies per hour; and
- eliminate the need for wood.

The nation's vent-free gas heating product manufacturers offer a wide range of products that include:

SPACE HEATERS

A variety of large and small vent-free space heaters are available — from 5,000 to 40,000 Btu — with numerous cabinet and burner designs.

Space heaters must be permanently installed on the wall or mounted on a floor stand. As the most cost-effective and compact vent-free appliance, space heaters offer the most installation flexibility.

GAS LOG SETS

Installed in a traditional masonry or listed factory-built fireplace designed for wood burning, vent-free gas logs operate with the fireplace damper closed, which allows all the heat to stay in the room and not go up the chimney. Choose from a wide variety of amazingly realistic flames and wood styles, including driftwood, oak, weathered oak, maple, pine, aspen, birch, split logs, and many others.

INSERTS

A vent-free gas fireplace insert installs within an existing masonry or factory-built fireplace—turning a messy, inefficient decoration into an efficient heat source. Inserts deliver the unbeatable heating efficiency of vent-free gas logs, but some also offer a blower for improved heat distribution.

GAS FIREPLACES

Vent-free gas fireplaces look just like traditional fireplaces, and come in all shapes and sizes. Because there's no chimney or vent, they can be installed against or into any interior or external wall at a fraction of the cost of a traditional fireplace installation.

These fireplaces can fit into a corner, serve as a room divider, be located under a window, or be placed in any other spot where there's access to a gas line. Recent hearth innovations include mini fireplaces for virtually any room in the home; an extremely efficient infrared ember bed that produces high heat output from low gas input; a fully automatic remote control providing instant ignition as well as precise control of thermostatic heating level, on and off times, flame height, and flow rate from 8,000 to 40,000 Btu/hr; and a new universal mantel system that can be used on many different brands and types of fireplaces.

GAS STOVES

They're easily mistaken for wood stoves, but cost considerably less to install and operate. And with a vent-free gas stove, there's no flue, no hole in the ceiling or wall, no wood to chop and haul, no soot, and no ashes to clean up.



**YOU CAN INSTALL
A VENT-FREE GAS LOG SET
OR INSERT IN
YOUR EXISTING
FIREPLACE**

If you have a traditional fireplace, you're already aware of how inefficient they are, as well as the associated odors, mess, and inconvenience.

All you need to do is install a set of vent-free gas logs in your existing fireplace.

Or, if your fireplace is damaged or inoperable, install a fireplace insert. These inserts include gas logs and also offer an optional blower for improved heat distribution.





**INSTALL
THEM ALMOST
ANYWHERE**

**ZONE HEAT AND
SAVE ENERGY
DOLLARS**

| *A vent-free gas heating appliance provides comfortable heat just where you need it.* |

You can lower the thermostat of your central heating system by adding supplemental heat in a primary gathering area of your home, such as the:

- living room
- dining room
- kitchen
- home office
- family room
- play room

Vent-free gas heating products are available in various styles to suit every application and location in your home. From glamorous to functional, from modern to traditional, there's a vent-free appliance that fits your needs.

LIMITED-USE AREAS

A vent-free gas heater is also ideal to warm limited use, hard-to-heat areas such as a basement, garage, room addition, sun porch, or recreation room.

INSTALL THEM ALMOST ANYWHERE

Because they don't require a chimney, vent-free gas heating products can be installed almost anywhere—



even along an inside wall. In contrast, installing a traditional wood fireplace is a major (and costly) construction project.

With a vent-free gas fireplace or heater, you have much greater flexibility in designing or redesigning your room.

ZONE HEAT AND SAVE ENERGY DOLLARS

A vent-free gas product can reduce your heating costs by allowing you to “zone heat.” Use your vent-free unit to provide abundant heat for the rooms in most frequent use, and turn down your central heating thermostat. In actual usage, homeowners spend most of their time in just a few rooms of the house, such as the kitchen or family room. So placing a vent-free gas appliance in a heavily used area can significantly save on heating fuel costs.

PRECISE COMFORT CONTROL

With today's new options in thermostatic wall mounted or hand held remote controls for vent-free heating appliances, it has never been easier to keep



your room at the exact level of heating comfort you want. Just dial in a temperature and your vent-free unit will maintain that temperature in the room. You can even set your control to have your vent-free appliance automatically go on and off at specific times.



7

**FREQUENTLY
ASKED
QUESTIONS
ABOUT
VENT-FREE GAS
APPLIANCES**

For more information go to www.ventfree.org

1

Are there any concerns about the emissions of these products?

A well-documented independent study on the effects of vent-free gas products emissions (*see pages 16-17*) concluded that vent-free gas heating products perform well within all nationally recognized guidelines and recommendations for indoor air quality (IAQ). In the rare instance consumers may have concerns about the health effects from natural gas or propane emissions, they should consult their family doctor. Copies of the research are available at www.ventfree.org.



2

Should homeowners be concerned about Carbon Monoxide (CO) emissions from vent-free appliances, especially in households with children, pregnant women, or elderly people?

The effects of vent-free products' emissions on sensitive populations were tested in the extensive independent study on indoor air quality. This research used as its criteria the recommended maximum levels of Carbon Monoxide (CO) as set by the Consumer Product Safety Commission (CPSC), with sensitive populations — such as children, pregnant women, and the elderly — as the benchmark. The results of the research proved that vent-free gas heating products performed well within the CPSC guidelines for CO.

3

Can a vent-free gas heater be used as a sole heat source?

No. All major building codes categorize vent-free products for supplemental use and recommend that a primary source of heat (e.g., a furnace) be present in the home before a vent-free product can be installed. It is clearly stated in the operating instructions of every vent-free appliance that vent-free gas products are for supplemental heating only.

4

Are vent-free gas products widely accepted for use in the U.S.?

Currently, 49 U.S. states allow the sale and installation of vent-free supplemental gas heat appliances and all building codes in the U.S. accept their use.

As of January 2006, the International Association of Plumbers and Mechanical Officials — Uniform Mechanical Code accepted the use of vent-free gas appliances for supplemental heating. Most states are now adopting the International Residential Code (IRC) which permits these products. The list of states can be seen at www.iccsafe.org.

5

Do vent-free products produce too much heat in tightly constructed homes?

The heat output of vent-free products that are properly sized can be easily controlled by the homeowner and set to the desired comfort level. However, installers of vent-free appliances in homes that have extremely tight construction must follow the manufacturer’s instructions and building code requirements for supplying ventilation and combustion air. In some cases, additional mechanical ventilation may need to be added before installing a vent-free gas heating appliance (see page 15).

6

If I buy a vent-free gas appliance, is it necessary to purchase a quality Carbon Monoxide detector as well?

All homes, whether their energy source is electric, gas, wood, or oil, should have a listed Carbon Monoxide (CO) detector. Primary sources of CO concern are automobiles, indoor grilling on hibachis, and improperly maintained gas appliances. An independent research study on vent-free products (see pages 16-17) concluded after extensive testing that CO emissions from vent-free gas products are well within nationally recognized indoor air quality guidelines, even for sensitive populations.

7

Can ceiling fans be installed in rooms with vent-free fireplaces?

Ceiling fans (or oscillating fans) may be used to help distribute the heat; however, fans should not blow directly into the fireplace or create drafts that alter the burner’s flame patterns, which can result in sooting.



**WHAT
FEATURES
ENSURE SAFE
AND RELIABLE
OPERATION**

*| A unique system called an Oxygen
Detection Safety-pilot, or ODS. |*

Oxygen Detection Safety-pilot (ODS) technology was adopted by all U.S. manufacturers for all vent-free gas products in the early 1980s.

ODS technology originated in Europe, where it has been used for more than half a century with an outstanding record of safety. Consumer Product Safety Commission (CPSC) accident/incident data compiled since 1980 show no documented deaths due to emissions associated with the use of an ODS-equipped vent-free gas heating appliance. Industry engineers say the ODS pilot is to gas what a circuit breaker is to electricity.



► HOW THE ODS WORKS

The ODS system consists of three main components:

- ◆ a precisely designed, oxygen sensitive pilot burner that regulates flame characteristics;
- ◆ a thermocouple¹ positioned in the mantle of the pilot flame; and
- ◆ a safety shut-off valve.

The pilot is designed to be stable within a very narrow operating range. The thermocouple responds to changes in the pilot flame characteristics and, when heated, generates a millivoltage², which keeps the gas supply valve in the open position.

If low levels of oxygen are detected by the ODS system, the flame extinguishes. The loss of flame causes the thermocouple to cool. This cooling reduces the millivoltage, which causes the gas valve to return to its normally closed position, thus turning off the fuel supply to the appliance. This extinguishes the flame and the pilot. The unit will not operate until the living space is properly ventilated and adequate oxygen is introduced, and the pilot is relighted.

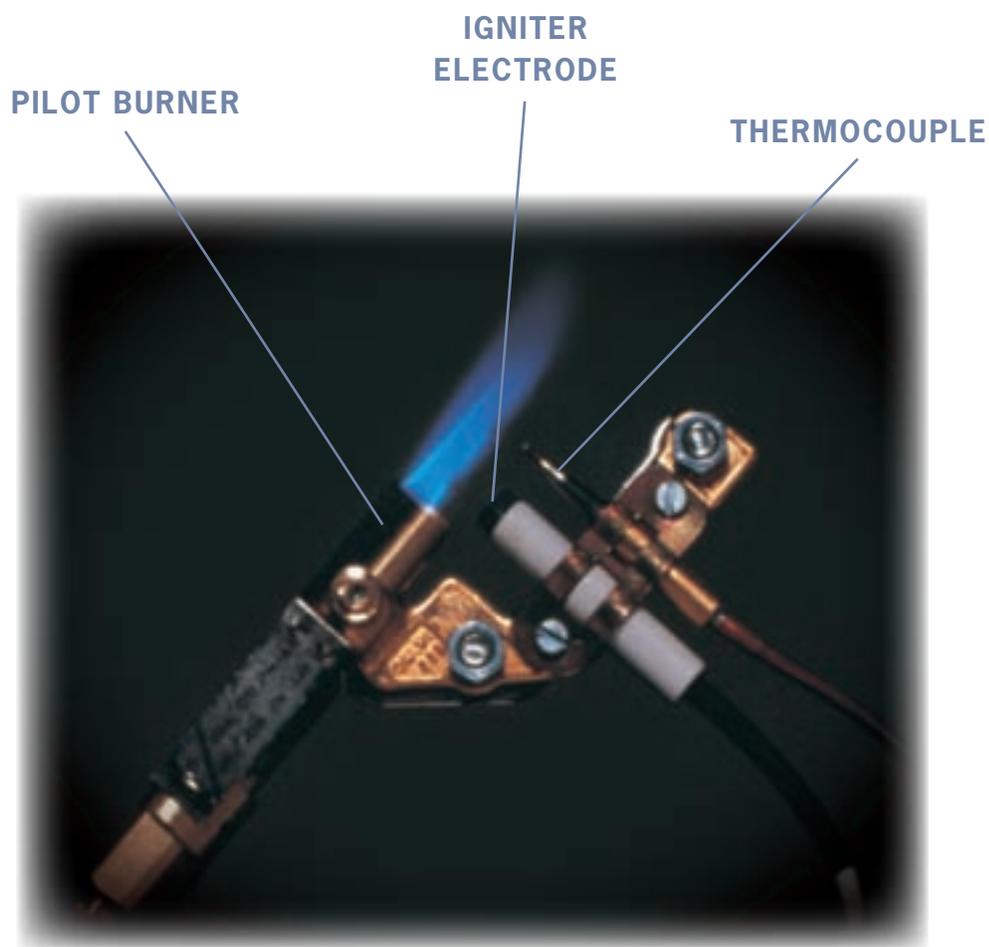
► IT'S TAMPER-RESISTANT

Every ODS system contains a precision orifice³. This orifice will disintegrate with any attempt at drilling it out to enlarge the pilot flame. Additionally, it is not interchangeable with a normal standing pilot. Furthermore, propane and natural gas vent-free products cannot be converted from one type of gas to another.

► MANY SAFETY FEATURES ENSURE RELIABLE OPERATION

Besides the ODS valve, every vent-free heating appliance is also equipped with:

- ◆ an automatic shut-off valve, which stops the flow of gas if the pilot extinguishes or the gas flow is interrupted in any way;
- ◆ precision-engineered burners to produce the cleanest, most complete gas burn, with no lift-off or flashback when subjected to low input rates, low pressure, or drafts;
- ◆ an internal, non-adjustable pressure regulator that prevents overfiring in case of increased gas pressure;
- ◆ an ignition device, usually a Piezo igniter⁴, which eliminates the need for matches;
- ◆ defined cabinet temperature limits for wall- or floor-mounted heaters;
- ◆ a defined distance to combustible surfaces for all gas appliance categories; and
- ◆ safety grills for heaters, fire screens, and hoods for gas logs.



¹ **Thermocouple:** A device consisting of two pieces of dissimilar metals joined together at one end (hot junction). When heated, the thermocouple produces DC voltage to power the thermoelectric gas valve. A safety feature on gas hearth products.

² **Millivolt (mV):** Unit of electromotive force equal to one one-thousandth of a volt.

³ **Orifice:** The opening in a device whereby the flow of gas is controlled and through which the gas is discharged to either a pilot burner or main burner.

⁴ **Piezo igniter:** A device that delivers an igniting spark by means of pressure on a crystal.

**CHOOSING
THE RIGHT
VENT-FREE
GAS HEATING
APPLIANCE
FOR YOUR
HOME**

Vent-free gas heating may be the answer to your zone heating needs, but check with your local code official before buying.

**NATIONAL MODEL CODES/
CODE GROUPS**

The following model codes/code groups permit the installation of listed vent-free gas products:

- ◆ National Fire Protection Association (NFPA 54–National Fuel Gas Code)
- ◆ Building Officials and Code Administrators (BOCA)
- ◆ Southern Building Code Congress International (SBCCI)
- ◆ Council of American Building Officials (CABO)
- ◆ International Mechanical Code (IMC)
- ◆ International Fuel Gas Code (IFGC)
- ◆ International Residential Code (IRC)
- ◆ International Association of Plumbing and Mechanical Officials (IAPMO)
- ◆ Uniform Mechanical Code (UMC)



Most states in the U.S. now allow the sale and installation of vent-free gas products. However, there are 45,000 different code officials in the country. Any of the codes listed on page 12 may be used by specific jurisdictions. In most cases, vent-free gas products will be permitted.

Because counties and municipalities may adopt different codes than state agencies, please check with your salesperson, installer, or local codes officials to determine the current code where you plan to install the appliance.

OTHER CONSIDERATIONS

Also double-check with your retailer before installing a vent-free heating appliance in:

■ AN EXTREMELY TIGHT HOME

If your home shows symptoms of inadequate ventilation (moisture on the insides of windows, mildew, and the shower or bath humidity lingers), more ventilation may be required prior to adding additional vent-free gas appliances. Also, if you have an extremely tight new home, talk with your builder or contractor to make sure your home is properly ventilated;

■ STATE OF MASSACHUSETTS

If you buy a unit in Massachusetts, be sure to get a copy of the Massachusetts Regulations from your retail store prior to installation. This is the 49th state to allow for vent-free products and special permits are required.

■ HOMES AT HIGH ALTITUDE

(i.e., homes at 4,500 feet above sea level or higher)

Homeowners in these areas should check with their local codes officials. More information is available by going to www.ventfree.org and clicking on “Information on vent-free use at high altitudes.”



WHO SETS THE STANDARDS?

The American National Standards Institute — known as ANSI — maintains a strict standard for vent-free gas heating appliances. The standard, called ANSI Z21.11.2, is updated constantly to provide for product safety and performance, based on the latest technology.

HOW DO I KNOW THAT A GAS PRODUCT MEETS ANSI STANDARDS?

When shopping for your vent-free gas products, always be sure the models you are considering are certified as complying with the ANSI Z21.11.2 standard by a nationally recognized laboratory.



Examples of Nationally Recognized Laboratories

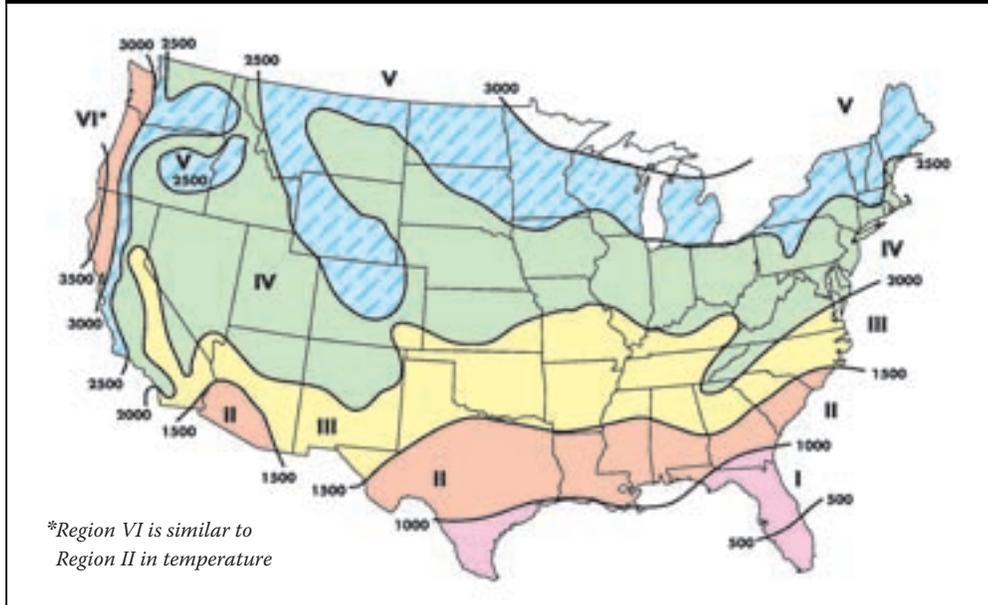


WHAT SIZE (Btuh) VENT-FREE GAS HEATING APPLIANCE SHOULD I CHOOSE?

Because there are broad temperature ranges in all regions of the country, the desired heat output from a vent-free gas appliance will vary dramatically based on the season and usage patterns of the household. All vent-free gas products offer a range of heat settings, whether manually or thermostatically controlled. In terms of indoor air quality, any size of product can be chosen based on personal preference in all applications other than in the exception described in heating Region V. *See illustration on next page* ►

Installation of vent-free gas products must meet the guidelines of the national fuel gas code ventilation requirements, as is the case for all gas appliances.

U.S. DEPARTMENT OF ENERGY HEATING REGIONS



1. INFORMATION THAT THE CONSUMER MUST PROVIDE:

- a.** Determine the volume of space to be heated in cubic feet. This space may be a single room, or it may be connecting rooms or areas.
- b.** Select the house construction: loose, average, or tight.
- c.** Select the type of heater control system desired: thermostatic or manual operation.
- d.** Determine the region of the country where the house is located.

2. HEATER SIZING CALCULATION

- a.** Find the heater input rate (in Btuh/ft³) from Table A according to the information at left from 1b, 1c and 1d.
- b.** Multiply this value from Table A by the volume of space from 1a. This result will provide a minimum heater input (in Btuh) to ensure human comfort under a range of operating conditions.

EXCEPTION: In heating Region V, if the heater is to be installed in a room that can be isolated from other rooms by doors, find the heater input rate (in Btuh/ft³) from Table B. Multiply this value from Table B by the volume of space from 1a. This result will provide a maximum heater input (in Btuh) to ensure acceptable indoor air quality. However, it may not supply enough heat under certain operating conditions. Alternatively, if you increase the ventilation to this isolated room — e.g., by installing a permanent opening to an adjoining room or area at least 40 percent greater in volume than the isolated space — this exception does not apply.

TABLE A SIZING GUIDELINES FOR VENT-FREE GAS PRODUCTS INSTALLED IN ALL SPACES IN ALL HEATING REGIONS (EXCEPT ISOLATED SPACES IN REGION V)

| Heating Region | House Construction | | | | | |
|----------------|--|--------|----------------------|--------|--------------------|--------|
| | Loose ¹ | | Average ² | | Tight ³ | |
| | Appliance Operation | | | | | |
| | T'Stat | Manual | T'Stat | Manual | T'Stat | Manual |
| | Minimum Input Rate Needed to Maintain Comfort Btuh/ft ³ | | | | | |
| I | 2.30 | 1.60 | 1.85 | 0.90 | 1.50 | 0.60 |
| II, VI | 3.40 | 2.70 | 2.20 | 1.45 | 1.80 | 1.00 |
| III | 4.30 | 3.50 | 2.60 | 1.95 | 2.20 | 1.30 |
| IV | 5.40 | 4.50 | 3.15 | 2.45 | 2.40 | 1.65 |
| V | 6.70 | 5.70 | 3.85 | 3.15 | 2.80 | 2.10 |

TABLE B SIZING GUIDELINES FOR VENT-FREE GAS PRODUCTS INSTALLED IN ISOLATED SPACES IN HEATING REGION V

| Heating Region | House Construction | | | | | |
|----------------|---|--------|----------------------|--------|--------------------|--------|
| | Loose ¹ | | Average ² | | Tight ³ | |
| | Appliance Operation | | | | | |
| | T'Stat | Manual | T'Stat | Manual | T'Stat | Manual |
| | Maximum Input Rate Needed to Maintain Indoor Air Quality Btuh/ft ³ | | | | | |
| V | 5.40 | 4.50 | 3.20 | 2.55 | 2.65 | 1.95 |

¹ Loose construction (high heat losses and infiltration rate): little insulation, no storm doors and windows, no vapor barrier, undampened fireplace, and an ACH of about 1.0.

² Average construction (typical heat losses and infiltration rate): insulated, vapor barrier, loose storm doors and windows, dampened fireplace, and an ACH of about 0.5.

³ Tight construction (low heat losses and infiltration rate): well insulated, vapor barriers, tight storm doors and windows with weather-stripping, dampened fireplace, and an ACH of about 0.35.

(ACH=Air Changes Per Hour)

If you live in the state of New York, be sure to ask your dealer to give you a set of sizing guidelines for New York State. If not available, contact the Alliance office at ventfree2@verizon.net.

RESEARCH
SHOWS
WHAT CUSTOMERS
ALREADY KNOW

Independent tests on indoor air quality and humidity show that homeowners can breathe easy.

All homeowners want to be certain that their home appliances meet nationally recognized guidelines for indoor air quality (IAQ) and do not emit excessive humidity. That's why the Vent-Free Gas Products Alliance commissioned independent testing of vent-free gas products by two of the nation's leading testing firms. The Vent-Free Gas Products Alliance is a coalition of members of the Vent-Free Gas Products Section of the Air Conditioning, Heating, and Refrigeration Institute (AHRI), a trade association representing more than 350 manufacturers of air conditioning, heating and commercial refrigeration equipment. The research findings are on these two pages.

INDEPENDENT RESEARCH ON VENT-FREE GAS PRODUCTS AND INDOOR AIR QUALITY

To document how vent-free gas products affect indoor air quality, the American Gas Association Research (AGAR) Laboratories[†] performed an extensive, independent scientific study. They ran trials with real vent-free products in a real home — the AGAR research and demonstration house. AGAR scientists tested the levels of all five major contributors of indoor air quality — oxygen, carbon monoxide, carbon dioxide, nitrogen dioxide, and water vapor (humidity) — against the latest indoor air quality guidelines and recommendations.

The researchers concluded that vent-free gas heating products performed well within nationally recognized guidelines for indoor air quality.

Table C at right shows how vent-free gas products perform compared to national indoor air quality guidelines and standards.

This research proves that vent-free gas heating products meet applicable emissions requirements,

even when used over extended time periods with oversized units.

INDEPENDENT RESEARCH ON VENT-FREE GAS PRODUCTS AND HUMIDITY

Most people are aware that sustained high humidity can encourage mold growth. But what causes sustained high humidity in a home? To answer this question regarding vent-free supplemental gas heating products, the Vent-Free Gas Products Alliance decided to find out once and for all.

The Alliance commissioned an independent research study to get the answer. The study, titled *Impacts Of Vent-Free Gas Heating Products On Indoor Relative Humidity*, was designed to address the following question: "Do vent-free gas heating products generate enough water vapor to raise indoor relative humidity levels high enough to foster mold growth?"

The rigorous and comprehensive study was completed in December 2002 by risksciences, LLC, an independent scientific consulting firm nationally recognized for its expertise in human exposure modeling in residential environments. The research study concluded:

For the vast majority of homes in the U.S., vent-free gas heating products DO NOT generate enough water vapor to raise indoor humidity levels high enough to foster mold growth.

Furthermore, the findings indicated that greater emphasis should be placed on other factors that can cause humidity levels to exceed mold formation thresholds, such as aging homes, outdated construction, poorly sealed or leaky windows, wall insulation, insufficient ventilation, and maintenance of air conditioning systems.

See Table D at right for the results of the research study on vent-free gas products and humidity — and breathe easy.

[†] The American Gas Association's Research Division (AGAR) is the research arm of the International Approval Services (IAS), a nationally recognized testing agency, and the most renowned independent research body for gas products. This laboratory has been certifying gas appliances since 1928 to ANSI safety standards. In 1997, AGAR was purchased by Energy International, Inc. IAS is now CSA America and is located in Cleveland, OH.

In the AGAR study, vent-free gas heating products performed well within nationally recognized guidelines for indoor air quality.

TABLE C AGA RESEARCH COMPARISON OF INDOOR AIR QUALITY (IAQ) GUIDELINES TO VENT-FREE GAS PRODUCTS' EMISSIONS

| Combustion Byproduct | Specifying Agency | National IAQ Standard/Guidelines (exposure level/time) | Vent-Free Gas Products Emissions |
|-------------------------------------|---|--|------------------------------------|
| Carbon Monoxide (CO) | Consumer Products Safety Commission (CPSC)* | 15 ppm avg/8 hours 25 ppm avg/1 hour | 2.5 ppm/8 hours 1.5 ppm/1 hour |
| Nitrogen Dioxide (NO ₂) | Consumer Products Safety Commission (CPSC) | 0.3** ppm avg/1 hour | 0.22 ppm/1 hour |
| Carbon Dioxide (CO ₂) | Residential IAQ Guidelines/ Canada | 3500 ppm avg/1 hour | 1500 ppm/8 hours |
| Oxygen (O ₂) | National Institute for Occupational Safety and Health | 19.5% minimum/ continuous | 20.4% continuous |
| Humidity (H ₂ O) | American Society of Heating, Refrigerating and Air Conditioning Engineers | 60% → 40%*** maximum | 36.5% maximum with no condensation |

Source: AGAResearch Study, GRI Report 96/0093 - 1996

* Recommended maximum levels of Carbon Monoxide (CO) are set by the Consumer Product Safety Commission, with sensitive populations — such as children, pregnant women and the elderly — as the benchmark.

** The original research used 0.5 ppm in the absence of a nationally recognized guideline. Two years after the original research, CPSC recommended 0.3 ppm, and the vent-free industry immediately adopted this new guideline.

*** Depending on DOE Heating Region

Vent-free products DO NOT raise indoor humidity levels high enough to foster mold growth.

TABLE D INDOOR RELATIVE HUMIDITY FOR ALL HOUSES WITH AND WITHOUT A VENT-FREE GAS APPLIANCE¹

| DOE Region | Outdoor Temperature (°F) ² | Outdoor Humidity Range (%) ³ | Vent-Free Appliance Present? | Other Water Sources Present? | Indoor Relative Humidity (%) | | | Percent of Cases Below 70% Relative Humidity |
|------------|---------------------------------------|---|---|------------------------------|------------------------------|-----------------|---------|--|
| | | | | | Mean | 90th Percentile | Maximum | |
| I | 56 | 50 to 90 | Yes | Yes | 47.2 | 57.2 | 76.3 | 99.9 |
| | | | No | Yes | 45.2 | 54.5 | 66.8 | 100 |
| | | | % Contribution of Vent-Free Appliance to Total Indoor Relative Humidity | | | 4.2 | 4.7 | 12 |
| II | 45 | 50 to 90 | Yes | Yes | 35.7 | 43.5 | 59.3 | 100 |
| | | | No | Yes | 31.9 | 38.7 | 49.5 | 100 |
| | | | % Contribution of Vent-Free Appliance to Total Indoor Relative Humidity | | | 11 | 11 | 17 |
| III | 36 | 50 to 90 | Yes | Yes | 29.1 | 36.5 | 51.6 | 100 |
| | | | No | Yes | 24.0 | 29.4 | 45.6 | 100 |
| | | | % Contribution of Vent-Free Appliance to Total Indoor Relative Humidity | | | 18 | 19 | 12 |
| IV | 26 | 50 to 90 | Yes | Yes | 23.6 | 31.9 | 46.3 | 100 |
| | | | No | Yes | 16.8 | 21.1 | 35.9 | 100 |
| | | | % Contribution of Vent-Free Appliance to Total Indoor Relative Humidity | | | 29 | 34 | 22 |
| V | 13 | 50 to 90 | Yes | Yes | 19.6 | 29.1 | 43.5 | 100 |
| | | | No | Yes | 11.2 | 15.1 | 29.2 | 100 |
| | | | % Contribution of Vent-Free Appliance to Total Indoor Relative Humidity | | | 43 | 48 | 33 |

Source: risksciences, LLC, research study, December, 2002

¹ Based on 200,000 iterations — 20,000 iterations per region, with and without a vent-free gas appliance.

² Based on 1,000-hour heating temperature.

³ Rounded range that encompasses the average monthly minimum to the average monthly maximum outdoor relative humidity for the period November through February for all five DOE regions (i.e., DOE Regions I, II, III, IV, and V), based on 30-year climatological data (NOAA 2001).

(For a map of Department of Energy Heating Regions, see page 14.)

VENT-FREE GAS PRODUCTS ALLIANCE MEMBERS



**Copreci S. Coop.
Mondragon Components
USA, Co. (C)**
2621 Sandy Plains Rd., Suite 303
Marietta, GA 30066
678-560-2154
www.copreci.com
www.mondragonusa.com



**Continental
Appliances, Inc., dba
ProCom
(SH, L, F, S)**
4600 Highlands Pkwy SE, Suite #D/E
Smyrna, GA 30080
678-424-7163
www.usaprocom.com



**Empire Comfort Systems,
Inc. (ECS)
(SH, L, F, FI, S)**
P.O. Box 529
Belleville, IL 62222-0529
800-851-3153
www.empirecomfort.com



**Rasmussen
Gas Logs & Grills (L)**
12028 E. Philadelphia Street
Whittier, CA 90601
800-782-1365
www.rasmussen.biz



**Louisville Tin and
Stove Company, Inc. (SH)**
P.O. Box 2767
Louisville, KY 40201-2767
502-589-5380
www.cozyheaters.com



S.I.T. Controls USA, Inc. (C)
900 Center Park Drive, Suite J
Charlotte, NC 28217
704-522-6325
www.sitgroup.it



Maxitrol Company (C)
P.O. Box 2230
Southfield, MI 48037
248-356-1400
www.maxitrol.com



**Williams Furnace Company
(SH, L, F, FI, S)**
250 West Laurel Street
Colton, CA 92324-1435
888-444-1212
www.williamscomfortprod.com



**Monessen Hearth
Systems, Inc. (SH, L, F, FI, S)**
149 Cleveland Dr.
Paris, KY 40301
800-867-0454
www.monessenhearth.com



Worgas, Inc. (B)
784 Interstate Drive
Bowling Green, KY 42102-4323
270-842-4700
www.worgasinc.com

KEY

SH = Space or Room Heaters
L = Logs
F = Fireplaces
FI = Fireplace Inserts
S = Stoves
C = Controls
B = Burners

\$ensible Heat®



For more information, or for an executive summary of the research on vent-free gas products and indoor air quality or relative humidity, contact:

Vent-Free Gas Products Alliance
8225 Madrillon Estates Drive
Vienna, VA 22182

ventfree2@verizon.net | www.ventfree.org

The Vent-Free Gas Products Alliance is a coalition of members of the Vent-Free Gas Products Section of the Air Conditioning, Heating, and Refrigeration Institute (AHRI), a trade association representing more than 350 manufacturers of air conditioning, heating, and commercial refrigeration equipment.



TOP 10 REASONS

FOR OWNING A VENT-FREE SUPPLEMENTAL GAS APPLIANCE

- 1 Tens of millions of units have been installed in the U.S. since 1980.
- 2 Outstanding safety record per Consumer Product Safety Commission data.
- 3 49 states permit installation — with California being the only state that does not allow vent-free use.
- 4 National Fuel Gas Code/NFPA 54 ANSI Z223.1 permitted use since 1980. UMC accepted vent-free appliances as of January 2006 and all major building and mechanical codes including the ICC-IMC.
- 5 Air volume requirements for combustion identical to vented products per NFPA 54.
- 6 Scientific IAQ Research confirms that products perform well below recognized IAQ guidelines.
- 7 Required ODS/Oxygen Detection Safety-Pilot equivalent to electric circuit breaker.
- 8 Safety features include automatic gas valve, internal regulator, precision burners, and piezo-igniter.
- 9 100% compliance of U.S. products listed to ANSI Z21.11.2 standard since 1980. Fixed installation plumbed to fuel supply enhances safety.
- 10 All manufacturers recommend use as supplemental heat except during power outage. Homes equipped with a vent-free unit are allowed to use these units as auxiliary heat during emergency situations.