



BULLETIN RC348
VENT FREE REFERENCE
QUALITY FARM & FLEET

Generally, modern vent free gas heaters are:

- * Inexpensive and have low operating cost
- * Energy Efficient (99.9%)
- * Provides warmth during power outages (No electricity required unless a blower is utilized)
- * Designed Certified by AGA (The American Gas Association) and complies with the latest National Safety Standards (ANSI Z21.11.2)
- * Produce less than 40,000 BTU's of heat which is the maximum figure
- * Are durable and maintenance free other than periodical cleaning
- * Are easily and economically installed

In the United States alone, there are approximately 5,000,000 American homes in which vent free gas products are installed.

According to the Gas Appliance Manufacturers Association (GAMA) more Americans are buying vent free gas appliances than any other type of supplemental product.

I presume all of you have heard about Oxygen Depletion Sensor (ODS). Whether you have or not, it is information worth repeating. Prior to 1980, vent free products required outside make up air for combustion to prevent dangerous buildups of carbon monoxide. And, it is worth noting that products built prior to 1980 were no where near as clean burning as modern appliances which further contributed to the problems.

Now all vent free gas heating appliances are equipped with a very unique safety pilot system, the Oxygen Depletion Sensor. ODS is the proven technical innovation that revolutionized the safety of vent free gas appliances.

Normal household oxygen levels vary between 20 and 22% - slightly less at higher altitudes.

In operation, the ODS will automatically shut off the supply of gas to the appliance should the oxygen level, in the room or area in which it is installed, fall to 18%.

Complete combustion of gas - either propane or natural - requires a sufficient quantity of air. Without adequate oxygen, incomplete combustion may occur and produce hazardous amounts of carbon monoxide. The ODS consists of a precisely designed pilot burner that regulates flame characteristics and a thermo-couple positioned precisely in the outer or hottest part of the flame to operate a safety shut off valve. The pilot flame is stable, only within a very narrow operating range. So, if the oxygen level around the ODS falls below an unacceptable level, the flame lifts off and is extinguished. In turn, the thermo-couple cools, reducing the milli-voltage to the shut off valve solenoid and causing the gas valve to shut off. Some folks get a bit concerned about "millivolts" and how they are produced without an external electrical source. All that is required to produce this minor amount of voltage is a heat source - in this case, the pilot flame as it heats two dissimilar metals.

An ODS cannot be retrofitted fitted to an appliance without one - nor can an ODS be readjusted due to its fixed orifice and precise spatial relationships. Appliances with ODS should be handled very carefully to avoid changing the exact positioning on which the appliance and this safety system depend.

There is another subject which I'd like to address here and that is Indoor Air Quality or IAQ. Maybe you have heard something about it already. I can assure you, you will hear more in the future. By the year 2000, the Federal Government will issue minimum IAQ Standards. Regardless, primary gas, combustion by-products that can affect Indoor Air Quality are carbon monoxide, carbon

dioxide, nitrogen dioxide, oxygen and water vapor or excess humidity. Today's vent free heating products operate well within nationally recognized standards and recommendations for all five elements. Emission levels for these by-products are checked during product safety testing by at least one organization, namely the American Gas Association (AGA). And in 1995, the vent free gas product alliance of GAMA (Gas Appliance Manufacturers Association) commissioned their own study on Indoor Air Quality as it relates to vent free gas heating products in the home. Results proved that vent free gas heating products met or exceeded national standards.

I want to say one further thing about safety and about the use of vent free heating appliances and then we will move onto something more interesting: Earlier I stated that there were millions of these in use in the United States installed since 1980. World wide and principally in Europe where the ODS technique was developed there are over 35,000,000 vent free products installed. To date, not one death has been attributed to a vent free heating appliance manufactured since 1980. Not even Gerber Baby Food's can make such a claim.

Where are vent free gas heating products legal for installation?

First, all National Building Codes, with the exception of ICBO - UMC, installation permit information of listed vent free gas products, they are:

NFPA -	National Fire Protection Association
BOCA -	Building Officials and Code Administrators
SBCCI -	Southern Building Codes Congress International
CABO -	Counsel of American Building Officials
IMC -	International Mechanical Codes

There are a few states which prohibit residential use of vent free gas heating appliances. And, as is so often the cause, it's because the states' building codes haven't caught up with vent free technology.

States prohibiting use are: Alaska, California, Montana, and Massachusetts. Minnesota, Colorado, and Utah do not have state wide prohibition, as several counties and municipalities in each state do permit the product. Finally, Wisconsin restricts sales for use in homes built since 1980.

There are differences between some counties and municipalities within a state because they adopt different codes than the state itself. Therefore, it is wise to determine the current code for the location your store serves.

There are other considerations which might limit vent free installation:

1) If the home is extremely air tight. You will know if it is because it shows obvious symptoms - moisture on windows, mildew and lingering humidity after showering. If these conditions exist, the home owner should talk to a builder or contractor to make sure the home is properly ventilated.

2) Homes at high altitudes (4,500 ft. above sea level). Due to lower atmospheric pressure at higher altitudes, the user may experience nuisance pilot outage and flame shut down.

Of greatest concern to anyone interested in heating with a vent free gas appliance should be what size to use. The US Department of Energy has identified five separate heating regions within the United States, and I'm including a map of the US identifying those zones, along with a sizing guide line which was supplied by the Vent Free Gas Products Division of The Gas Appliance Manufacturers Association. You'll notice this is an all inclusive guide line and takes in to account the type of construction - whether it is loose, average or tight and whether or not a thermostat is being used. All calculations are in BTU per hour, per cubic feet.

Just so you know how this chart works, look at Zone 4, average construction. And, let's say the area we want to heat is 600 square feet (30 X 20). If this area has an 8-foot ceiling, then the area to be heated has 4,800 cubic feet. Simply multiply the 4,800 cubic feet by the value from Table A to determine the size appliance necessary. In this case, with the thermostat we would need a heater capable of producing only 15,120 BTUs per hour. Without a thermostat, only 11,760 BTUs per hour would be required.

For those few stores located within Region 5, please note there is a separate guide line for vent free heaters for installation in "Isolated spaces." A full explanation is given on this page.

ODS pilot is to gas with a circuit breaker or fuse is to electricity. All ODS systems contain a very precise orifice which is made from a crystalline ruby. It is, therefore, tamper proof and will shatter if any attempt is made to enlarge it. Additionally, ODS Orifices are not interchangeable with a normal standing pilot.

Other than the ODS system, vent free heaters are also equipped with: 1) An automatic shut off valve which stops the flow of gas should the pilot be extinguished or if the gas flow is in any way interrupted. 2) Precision engineered burners which produce the cleanest and most complete gas burn, experience no lift off or flash back even when subjected to low input rates, drafts or low inlet pressure. 3) A nonadjustable, internal pressure regulator which prevents over firing in case of excessive gas pressure. 4) An automatic ignition system - in our case a Piezo Ignitor for matchless ignition. And in the "for what's it worth department," a Piezo Ignitor is simply a mechanical device which delivers a high intensity spark by exerting pressure on a crystal. 5) Highly restricted limits for cabinet temperatures for both wall and floor mounted heaters. 6) Clearly defined distances allowed to combustible surfaces. 7) Safety grills and screens for heaters of all descriptions.

If there is one drawback by to heating with vent free appliances, it is the tendency to over size the appliance for the area to be heated resulting in an excessive level of humidity, a condition which is particularly aggravated in "tighter" homes where the air change rate is already too low.

When outside temperatures fall so does relative humidity (water vapor). Many people in cold climates use humidifiers to supplement indoor moisture. Vent free gas heating products are not intended to replace humidifiers but they do perform a similar function and can if properly sized help to achieve the recognized comfort level of 60% humidity in the home. To help a little bit with understanding this problem, consider that 2,000 square foot tight home requires about 4½ gallons of water every 24 hours to reach a 60% humidity level; an average home requires 8 gallons and a loosely constructed home would require 10 gallons. 40,000 BTUs per hour is the maximum amount allowable for any vent free gas heating product. And, when run continuously, a 40,000 BTU per hour appliance is only capable of producing slightly less than 3 gallons per hour which would pose a slight problem in a tightly constructed space in a tightly constructed home with less than 1,500

square feet. The answer, of course, is to use an appliance with a thermostat so that a constant production of humidity is avoided.

On the positive side (and maybe that should be stated as on the very positive side), vent free home heating equipment is energy efficient. It offers comfort you can afford. There's no chimney or vent allowing heat to escape. The heat stays where you want it. And because there is no open chimney or flue, vent free appliances using either natural or even propane are considerably less expensive to operate than electricity. It takes about 33% of your heating dollar to heat a room with gas as with electricity. And even if the home owner does heat with electricity, he can frequently derive benefit from vent free gas heating to help lower his electricity bill.

Since no chimney is required, the home owner is spared the costly expense of having a vent or chimney installed.

With vent free gas heating, you can have heat where you need it most. You can lower the thermostat on your central system by adding supplemental or zone heating in a primary gathering area of the home, such as the living room, kitchen, family room or home office. Further, vent free heaters can be used to heat those hard to heat limited use areas such as basements, garages, room additions, sun porches or even green houses.

Certainly, no heater of any kind offers the flexibility of installation provided with vent free. They can be installed practically anywhere.