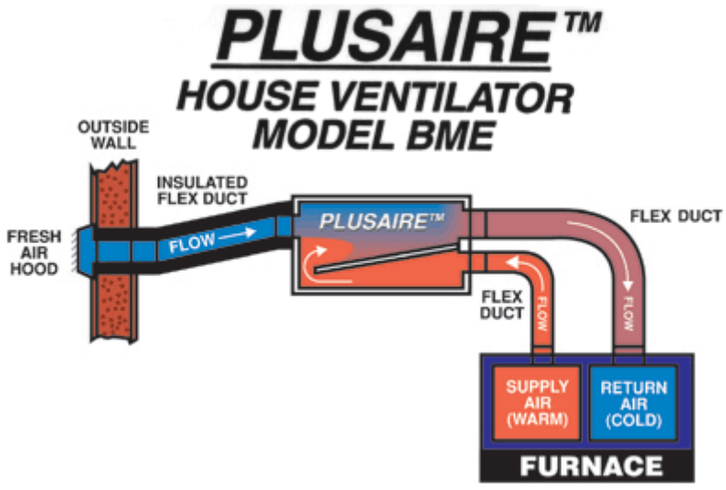
PLUSAIRE® gives fresh air for life

How It Works!



How PLUSAIRE® Works:

Expressed simply, **PLUSAIRE®** supplies warmed fresh air to your house at a rate equal to or greater than the rate at which your house is using it.

Mechanical ventilation is when a fan is used to draw air into the house. Passive ventilation is the same as opening a window. Air is free to enter as its required. Plusaire uses both methods to bring air into the house.

Firstly air is mechanically drawn into the house by the furnace fan during the heat cycle. This is the time when more oxygen is burnt and exhausted up the chimney than at any other time. Air is also mechanically exhausted by the various fans such as in the bathroom, clothes dryer, central vacuum, and kitchen causing outside air to be drawn into the house through Plusaire. Without an entry point for the replacement air it would have to find its way in through holes in the house structure, or depressurize the house.

Secondly, when the furnace fan is off, fresh air is drawn into the house through Plusaire by the combusting appliances such as a wood stove or fireplace. The air that is being combusted must be replaced and Plusaire does this in the most economical way.

Remember for every cubic foot of air that leaves a house a cubic foot must be brought in to replace it. The diagram shows the method of installation and the air flows.

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Problems & Cures

Indoor Air Quality

The Consumer Federation of America cites that indoor air pollution is responsible for up to 50% of all illness. Estimated cost in medical bills and lost work time amount to over $100 billion annually.

The American Medical Association has stated that with the reduction of fresh air entering a home, increased levels of Radon gas and other known carcinogens have been detected. The pollutants are known to cause serious health problems.

Indoor air quality, or lack of it, can be identified by the three "B's" of ventilation. The first "B" is **breathing.** Consider all of the people and pets breathing in air and out carbon dioxide. Each breath reduces the amount of oxygen that is available within the house. If the house is tight then the oxygen content will lessen and air quality will deteriorate.

The second "B" is **blowing.** Take into consideration all the fans within the house, bathroom, kitchen, clothes dryer, central vacuum, power vented furnace or water heater. Each of these blows air out, not one is designed to bring air in to balance itself. Too much air being blown out of a house can lead to depressurization. Smoke escaping from a wood stove is one indication that your house is being depressurized. Few people realize that they have a down-draft problem but freely admit to having that nice woodsy aroma. That nice woodsy aroma turns to a nasty creosote smell in the early hours of the morning.

The third "B" is **burning** and concerns all of the appliances that heat or involve the combustion process. These appliances include a furnace, water heater, fireplace, woodstove, cooker, toaster and toaster oven. When these appliances are working they simply burn up the oxygen, again reducing the amount available for breathing. If you leave a fireplace burning, in the early hours of the morning, when the fire is nearly out and the furnace comes on, there is enough draw up the furnace flue to reverse the flow in the fireplace chimney, thereby creating a downdraft and the nasty smell associated with it. This can also work in reverse where furnace fumes can be drawn out of a flue by a briskly burning fire. These fumes are dangerous and could lead to carbon monoxide poisoning.

If your house is closed up and does not have adequate ventilation, when morning comes you can actually smell the residue from the wood fire or the previous day's activities. Combine these with the household chemicals and the off gassing from furniture and carpets and you can see that you are living in a soup of low pressure polluted air. The easy answer is to open a window in each room however this solution is not always practical since the air coming in will be cold and your heating bills will go up very quickly. Obviously you need fresh air but in a controlled fashion and at the lowest possible cost. What is required is a ventilation system that is able to supply warmed fresh air, be able to compensate for negative air pressures, supply combustion air at a place and time when needed and be cheaper to run than opening a window. Fortunately the Plusaire® system was designed to do exactly that.

Tight House Problems

In the mid 1970's new houses were constructed and were advertised as being energy efficient. This trend has grown to the present. Now the houses are so energy efficient that some people boast of $300 yearly fuel bills. Building an energy efficient home really meant using better built windows and doors and sealing up the structure to stop the outside air from leaking in and the inside air from leaking out.

Unfortunately what was not apparent was that the older houses had air leaks which supplied combustion and ventilation air. What was starting to happen was that the energy efficient houses were becoming tighter and indoor air quality was deteriorating as a result. The tighter the house the worse the condition. Combustion and ventilation air is not able to infiltrate into the house and combustion devices are being starved of air. There is no replacement air for the exhaust fans to blow out which causes the house to depressurize. Depressurizing a house can lead to a new set of problems including carbon monoxide poisoning. The problem is not confined to new houses.

Anyone who has renovated with a few tubes of caulking, new windows, doors or siding, has changed the air infiltration rate. In every case the cost of heating would be less, but, tightening up the structure, without considering the need for combustion or ventilation air, can invite disaster.

Symptoms of a too tight house are condensation on the windows, smoke escaping from the fireplace or wood stove, mould or mildew growing in corners or cupboards, residual smoking or cooking odours and a general stale smell especially in the mornings. Another common sign is a high humidity level that cannot be corrected.

While these symptoms are unpleasant and undesirable, symptomatic health problems can be far more serious. Constant headaches, dizziness, sleepiness, watery eyes, breathing difficulties and in some cases death can be attributed to houses with poor air. Most susceptible are the very young and the elderly. Asthma sufferers and people with allergies are especially susceptible to poor quality air.

Since the tightness of the house is causing the health problems then it follows that if the house is made less tight then related health problems will also cease. The common thread linking all of these symptoms together is the lack of ventilation, and this can be verified quite easily by following some simple steps. Begin by opening a window about 1", on each floor. Leave the windows open for 24 hours or until the house symptoms are gone and then close the uppermost window each day until the symptoms reappear. This test requires very little effort and will only cost some heat. Measure the amount of opening that is left and that is the amount of opening that must be provided in the outside wall. This test will verify that you have a lack of ventilation air.

The simplest form of adding ventilation and combustion air is to keep the windows open but since the air coming in would be freezing cold it is not too practical. What is required is a device that brings in outside air, warms it, delivers it around the house and is as cheap to operate as opening a window. A Plusaire correctly sized for the house is such a device.

PLUSAIRE® House Ventilation System Gives Fresh Air For Life!

CONDENSATION

A house that is experiencing condensation has the potential of becoming a breeding ground for dangerous moulds. There are many thousands of moulds and none of them are desirable and all of them are preventable. All that is necessary for mould to form is moisture and warmth. A tight house contains enough moisture for mould to form. Few people realize the health problems arising from living in a tight house. A tight house will show its symptoms as condensation on windows and walls, combustion fumes coming out of the fireplace, stove, or furnace, or mould which shows itself as black streaks around windows or on walls.

Condensation forms when the moisture carried by the air touches a cold surface, it then changes from a gas to a liquid, water, then, if it is cold enough, to ice. When it is in its water form it soaks into surrounding woodwork or wall covering and, combined with the warmth, becomes a breeding ground for mould.

Smoke back drafting into a home from a fireplace is a symptom of a tight house because if air cannot get in then it cannot get out. A lack of air will cause the heater to burn inefficiently, which leads to carbon monoxide poisoning.

Musty smells around the house are caused simply by stagnant air.

These are typical symptoms of a tight home and fixing any one of them does not cure the illness just the symptom. If you cure the illness then the symptoms will disappear by themselves.

Since the common thread among the problems is a tight house it naturally follows that if it is engineered to be less tight then the problems will disappear. It seems ironic that a house that has been made tight to save energy should now be loosened up, but that is exactly what is needed to maintain a healthy environment. Years ago houses were not built as tightly and these problems did not exist, occupants had to add moisture to a home to make it more comfortable.

The Plusaire was designed to correct the problems caused by a tight house. The system works in two ways. Firstly it is powered by the furnace fan and brings in air when the furnace is in its heating mode. Secondly when the furnace is off Plusaire is in its passive mode and it brings in air as the house is exhausting it through the various fans and chimneys. In both cases the fresh air is tempered and delivered around the house by the ductwork. The whole house is now supplied with fresh air so that incomplete combustion and excessive moisture problems are eliminated.

BME Whole House Ventilator

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Fireplace or Chimney Back drafting

Fireplaces, wood stoves and inserts sometimes experience back drafting. This is generally blamed on the wind or the chimney not being high enough.

To really solve the problem first it has to be correctly defined.

Smoke or fumes come out of the heater when the door is opened, or the fire is difficult to light because of cold air coming down the chimney. In most cases it's because the house is at a lower pressure than outside and the air is being sucked backwards down the chimney. The problem can be worse when it's windy so generally the wind gets the blame. There is a name for this phenomena, it is called Stack Effect.

Stack Effect is occurring because the house is acting as a better chimney than the chimney. All of the air within the house is warmer and more buoyant than the air outside and therefore wants to rise. If there is an opening in the uppermost part of the house then the warm air will find it and leak outwards. This creates a powerful draw in the lower part of the home pulling cold air in through the easiest opening: the chimney. The areas that leak in the uppermost parts of the house are the attic access hatch, ceiling light fixtures, and poorly fitting windows. Each of these areas can be reworked to stop the air leaks. By doing this it will not only reduce the Stack Effect but your heating bills will also be reduced. What cannot be changed are the various exhaust fans that blow air out of the house. These can create a Stack Effect which can only be corrected by adding air to the house to balance the air that is being blown out. The cure to Stack Effect is therefore a combination of adding adequate ventilation air and sealing the leaks in the uppermost areas of the house. Sealing air leaks only in the basement can aggravate the situation.

Remember for every cubic foot of air that leaves a house, a cubic foot of air must be brought in to replace it.

A Plusaire® will handle the ventilation and combustion air, the other measures can be easily corrected by the homeowner.

Carbon Monoxide

Carbon monoxide (CO) is called the silent killer or the silent threat. This is because it is colourless, odorless, and silent. It is formed as a by-product of combustion of carbon-based fuels such as natural gas, propane (LPG), coal, coke, furnace oil, kerosene and wood. Carbon monoxide is absorbed by breathing and is 245 times more absorbent to the body than oxygen. Symptoms of poisoning can be mis-diagnosed as flu since they are very similar.

Symptoms are:

- Persistent, severe headaches
- Dizziness and blurred vision
- Nausea and vomiting
- Confusion, weakness of muscles
- Insomnia and constantly tired
- Chest pain
- Fainting
- Cherry coloured skin

The appliances that can generate CO within your house are the furnace, boiler, water heater, un-vented fuel burning heaters and solid fuel burning appliances. The three main problems are improper installation, chimney or vent blocked by bricks or bird's nests etc. and inadequate ventilation, providing insufficient air to properly fuel the combustion process.

Improper installation can be easily checked by referring to the manufacturer's installation instructions and by having your heating system checked yearly by a qualified professional. A flue system should be checked by a professional at the beginning and end of each burning season and cleaned accordingly. A flue that is in poor condition will be easily spotted and the appropriate action taken prior to disaster.

Supplying adequate combustion air is very simple. A window opened in the room of the appliance is a good, cheap method but not too practical since it will allow cold air in unless you close it when the appliance goes off. A better solution is a Plusaire® correctly sized for the house. It will supply not only adequate combustion air but also ventilation air to compensate for any of the exhaust fans that tend to depressurize the house.

PLUSAIRE® Changes Bad Air For Good

Asthma And Your Home's Air

Today's homes are being built or renovated to high standards and are finished off better than ever before. Factory windows and doors, siding and insulation are just a few of the improvements that are now available to the modern builder and renovator. Using these fine quality products has created very tight structures resulting in poor indoor air quality. The air is held captive by the tightness of the structure and the occupants breathe the same air which gradually gets staler and staler. A new home will also smell new for up to two years. This indoor air contains pollutants and moisture from the construction materials, clothes washing, showering and cooking generated by normal living. This moisture will form into condensation which can be seen on windows and walls. The condensation will be a breeding ground for moulds which produce airborne toxins called mycotoxins. These mycotoxins cause flu-like symptoms, memory loss and breathing difficulties such as asthma. Mould is never good and is especially harmful to the young and elderly.

Model BME Whole House Ventilator

The Plusaire system will continuously replace the air with warmed fresh air.
Plusaire is maintenance free and needs no electricity to operate.

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Radon

Radon is the second leading cause of lung cancer.

Radon is an odourless invisible gas that is produced naturally by the decay of the element of uranium. On average about six atoms of Radon emerge from every square inch of soil per second. In the air Radon is diluted to about 2 picocuries per litre of air which is not dangerous but in concentrations it has been found to cause lung cancer.

Radon gas can enter a house through a soil floor or through any crack or hole in or around the basement.

Since prevention is better than cure it would be wise to prevent any Radon from concentrating within the house. This can be done in two ways.

First, by sealing up any crack or hole in the basement wall and covering any earth floor with plastic sheeting. There are companies that specialize in Radon protection sealing.

The second is to increase the ventilation in the house so that concentrations cannot build up. All houses should have a complete air change every three to four hours. This level of air change has been found to be the most economical balancing air quality with heating costs.

Supplying adequate air is very simple. A window opened in each room is a good, cheap method but not too practical since it will allow cold air to enter. A better solution is a Plusaire correctly sized for the house. It will supply not only adequate ventilation air but also combustion air to compensate for any of the combusting appliances that burn up the oxygen in the house.

PLUSAIRE® gives fresh air for life

FREQUENTLY ASKED QUESTIONS

Q: I have a Heat Recovery Ventilator, do I still need a Plusaire?
A: Definitely yes. A Heat Recovery Ventilator (HRV) works by bringing in as much air as it blows out, it is what is called a balanced system. Without this balance the HRV would not work. Unfortunately houses also exhaust air with fans, clothes dryers, central vacuums etc., so the house is exhausting more air than it takes in. For every cubic foot of air that leaves a structure, a cubic foot of air is required to replace it. Since the HRV is a balanced system it will not add the extra air that is needed. A Plusaire is designed to bring in warmed air at a rate equal to or greater than the rate at which the house is using it.

Q: I have a new house that is tight, what benefit would a Plusaire give me?
A: A tight house costs less to heat than one that has more leaks but the air within the house is more likely to be stale and condensation is likely to be more of a problem. Excessive condensation can lead to mould and mildew building up in corners and areas that do not have a regular air flow. Plusaire brings in fresh air at the rate your house is expelling it.

Q: I have an older house with leaky windows, would a Plusaire benefit me?
A: Yes. Your house is leaking air inwards which means that the house is leaking air out of upper floor windows and is combusting it in the furnace or heating appliance. By adding a Plusaire you will be bringing in the required amount of air under controlled conditions, eliminating some if not all of the drafts. Sealing up the areas where the air is leaking out will also be an advantage and save on the heating bill.

Q: I have an old house and have been renovating, windows, doors, insulation, etc. Should I be concerned about air quality?
A: Yes, Anything that you do to tighten up your house without considering the need for adequate ventilation can invite disaster. By reducing the amount of air entering your house you could be starving your heating system of combustion air leading to the production of carbon monoxide. A correctly sized Plusaire will provide the combustion and ventilation air that will give correct comfort levels.

Q: I have condensation running down the windows, can Plusaire help?
A: Yes, the source of the water should be identified and corrected but it could be as simple as not enough ventilation air within the house. As a test try opening a window 1" on each level, if the condensation goes within 24 hours, you had a lack of ventilation air. A correctly sized Plusaire® will add the ventilation air that you are lacking.

Q: What is the running cost of a Plusaire?
A: Difficult to say since every house is different but a Plusaire will add about 3% to your heating bill. Unlike an HRV, Plusaire requires no hydro or maintenance.

If you have a question that hasn't been answered here please send us e-mail at sales@yourclimatecontrol.com and we will answer your question as soon as possible.

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Some Customers Comments

Mr. Gerald Fowlie, Barrie Ontario

We had just moved into a new home and there was enough water running down the windows that we had to mop it up each morning. A Plusaire was installed and the problem disappeared within 24 hours. I recommend that everyone install one in their home.

Mr. George Melville, Stoney Creek Ontario

Our house is well sealed and we felt that we needed some ventilation air. A Plusaire was the best value for our money and the easiest to install. The change in the air was felt immediately. The temperature was the same but the air felt different. It feels fresh.

Mr. Mike Peppard, Arkell Ontario

We have a five your old home that we built ourselves and we felt that the indoor air quality could be better. We had condensation on the windows and the wood stove would spill smoke into the room. We definitely needed some sort of ventilation. I researched the available products and found that the simplest solution was a Plusaire. I purchased a Plusaire, installed it myself and was very pleased with the instant result. The air felt fresh and the condensation that has always been a problem went.

Mr. Ed Croucher, Brantford Ontario

We live in a semi-detached house and the people next door smoke. In our basement there was a constant smell of cigarette smoke. The smoke was seeping through the adjoining wall and there was nothing we could do to stop it. We had a Plusaire installed and the smell was instantly gone.

Mr. Phil Stokes, Vancouver B.C.

The Plusaire we had installed in our home in Blackheath, Ontario did such a fine job for us that as soon as we purchased a home in Vancouver we had another Plusaire installed.

Mr. Larry Duke, New Liskeard Ontario

We heat with a wood/oil combination furnace but the house is so tight that we can sometimes smell creosote and wood smoke. We needed a ventilator to bring in some fresh air not only for the home but also for the furnace. A Plusaire was suggested so I installed a BME2. The change is truly amazing, I never knew how bad the air was until now.

Mr. Doug Kellough, Vineland Ontario

We had a Plusaire installed in our home in Hamilton to correct a smokey fireplace and it worked so well that as soon as our new house was built in Vineland the first thing I had installed was another Plusaire.

Mr Doug Albin, Paris Ontario

We have lived in the family farmhouse all of our lives. The basement under one section of the home is a crawl space with an earth floor. We were concerned about the air quality within the home and had a Plusaire UV installed. Withing one week the air quality greatly improved and the musty odours totally gone.

Installation Details

A Plusaire® system can only be installed on a forced air heating system. The type of fuel, natural gas, propane, oil, hydro, makes no difference to its operation.

For any of the models, the maximum length of ductwork between the Plusaire® and the furnace and the furnace and the outside wall should be twenty feet, (forty feet overall). For each of the models, a seven, eight or nine inch dia. hole must be cut in an outside wall to accommodate the fresh air hood and insulated flexible duct. If the wall is wood or siding, then the task is quite simple and fast. If however the wall is poured concrete or block you will need a hammer drill to cut the hole. Most heating contractors have these drills and would be able to cut the hole in about one hour.

Two rectangular holes must be cut into the furnace plenums to take the duct connections, but this is very thin metal and a pair of tin snips is all that is needed for the task. The Plusaire® module can be screwed directly to any convenient joist or rafter through the flange in each end. For convenience, model 1 will fit between 12" centre joists and model 2 will fit between 16" centre joists.

Once the plenum connectors and the fresh air hood are installed the only task left is to connect the flexible ducts.

You will notice immediately that the air feels different and you can feel confident that your house is now being automatically ventilated. For houses that have central air, a balancing damper, provided on all models, should be closed during the summer months so that the air conditioning system is not overloaded by pulling in hot humid air.

Technical Data

Experts in the home comfort field have stated that to achieve a healthy atmosphere within the home there should be a complete air change every 3-4 hours.

If a house is 1500 sq. ft. and the ceilings are 8.5ft. then it will have 12,750 cu. ft. of volume. To achieve the recommended comfort level the air must be replaced at a rate of 4207 cu. ft. per hour or 70.13 cu. ft. per minute. Use this formula to calculate your own house requirements.

$$\frac{.33(\text{sq. Footage of house} \times 8.5)}{60}$$

This gives the rate of air change at one every three hours. For one every four hours change the .33 to .25.

Experts state that a bathroom fan of the required capacity (70 ft./min) running continuously will accomplish the ventilation requirements. No mention is made however as to where the air is coming from. Obviously air must be introduced into a house so that house air can be exhausted, otherwise depressurization will take place. For every cubic foot of air that leaves a house, a cubic foot is required to replace it. A device able to introduce warmed fresh air at the rate at which your house is using it and be able to add combustion air at a place and time when it is needed is therefore essential.

A Plusaire® ventilation system sized for the house will look after the fresh air and combustion requirements in the most cost efficient way.