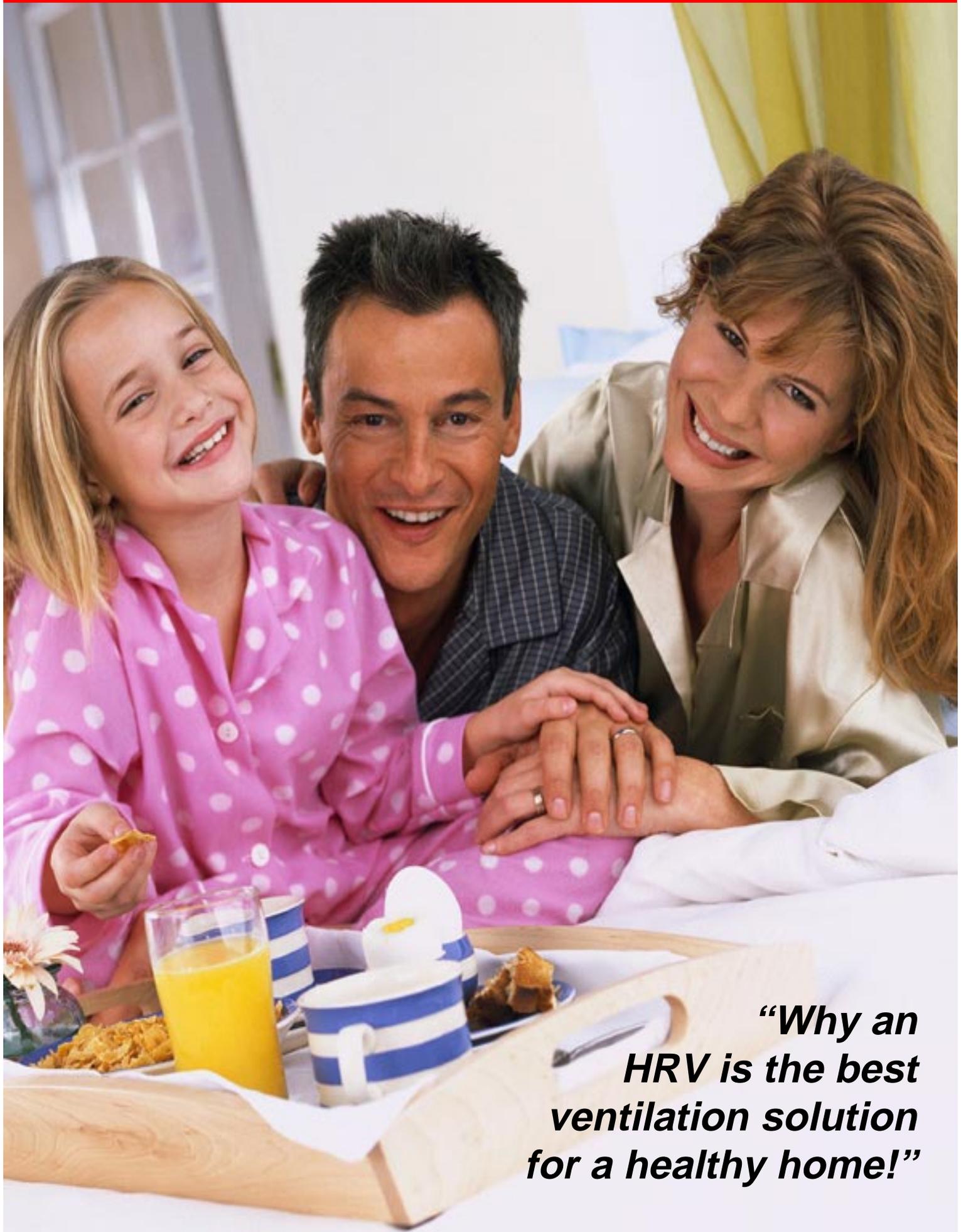


CLEANAIRE Heat Recovery Ventilator (HRV)



***“Why an
HRV is the best
ventilation solution
for a healthy home!”***

You wouldn't drink dirty wa

The importance of Indoor Air Quality (IAQ)



"Wrapped and sealed in a barrier"

The 1991 Building Regulations requires every new and renovated home to be energy-efficient. Architects and designers, builders and renovators, must include sealed and insulated windows, doors and floors. Under the outer cladding, whole houses are wrapped and sealed with a barrier which eliminates the natural ventilation of older homes. Energy efficient materials seal living spaces from the effects of outdoor weather, almost as air-tight as a plastic bag.

In winter, families spend 60% to 90% of their time indoors. With doors and windows tightly-shut to preserve energy efficiency and security, the pollutants that result from normal daily living accumulate to unhealthy levels. Isolated and sealed from outdoors, occupants are denied the most fundamental

necessity for life... **fresh outdoor air.**

Inadequate ventilation causes stale air to be shared by all occupants –humans,dogs,cats,birds,insects,etc. Just the thought of breathing air expelled from other lungs is sickening.

The food we eat and drink influences our health. So does the air that we breathe. Each day our lungs respire over 22,000 times, and that air (that we breathe) weighs approximately 14kg –ie. the air we breathe is over seven times by weight, the amount of food that we eat – every day!



Common household items such as paints, polishes, cleaners and disinfectants, furnishings, wallpaper, varnishes and plastics leach Volatile Organic Compounds throughout the home. Aerosol particles are readily inhaled. Children have higher breathing rates and inhale proportionately more lung damaging VOCs than adults.



Sick home –sick people. Headaches, watering eyes, colds and flu spread and take longer to recover from.



We protect children from contaminated food and water –but what about the indoor air pollution and allergens they play and sleep in?



ter... why breathe dirty air?

Humans, animals, insects and birds foul indoor air with bacteria exhaled from lungs and body odours. Carbon dioxide (CO₂), mould, fungi spores, bacteria, dust-mite allergens and animal dander are just a few of the normal everyday contaminants that compound and multiply in a poorly-ventilated home.

Volatile Organic Compounds (VOC 's) are chemicals which continuously leach and outgas from fibreboard furniture, insulation, carpets and underlay, foam upholstery, painted and varnished surfaces, wallpaper, drapes, bedding, books, etc. Air fresheners, aerosols, disinfectants, insecticides, hairspray, deodorant, cosmetics, soaps and oven cleaners are all significant sources of indoor air pollution (*read the contents label!*).

Gas cookers and heaters, cigarettes and candles release Carbon Dioxide (CO₂), Carbon Monoxide (CO) and Nitrogen dioxide (NO₂) to pollute indoor air. Many indoor pollutants are "heavier than air" and settle at floor level *where toddlers play*.

Lung tissue is fragile and easily damaged by pollutants. Home is the last place your family should have to breathe a concoction of pollutants, *however minor the VOC contaminant levels, 22,000 times a day.*



Great ventilation - but how practical in winter?

HEATING SYSTEMS DO NOT VENTILATE

Most home heating systems do not *ventilate*. They *recirculate* the same air. *Recirculated indoor air* may be heated, cooled, *dehumidified*, but unless it is replaced by fresh *outdoor air* it will remain **stale, foul, polluted air**. In many "tight" houses, *outdoor air* may only be introduced by the occasional opening of a door or a partially-open window. In homes unoccupied during the day and sealed for security, pollutants compound with each occupation.

HOW MUCH VENTILATION?

NZ Standard 4303 (1990) "Ventilation for Acceptable Indoor Air Quality" specifies the *minimum* residential ventilation rate *with outdoor air* at approximately **one complete air change every three hours, to be distributed throughout the home**. Outdoor air is defined as *air taken from the external atmosphere*. Roofspace air is not directly *taken from the external atmosphere* therefore it cannot be **outdoor air**. Roofspaces are often contaminated by biological odors, bacteria, gases, insects, animals and birds. The only direct source of **outdoor air** is **from outdoors**. Outdoor air is defined by statute. The 1991 Building Regulations define outdoor air as Oxygen 20.94%, Carbon dioxide 0.03%, Nitrogen and other inert gases 79.03%.



*Asthma allergens include dust mite excreta, pet dander, cigarette smoke, pollens, mould and fungi spores. Unless ventilated away, contaminant levels compound to unhealthy levels in a very short time. **Ventilation by Dilution** is a most effective way to reduce exposure to safe levels.*

Condensation is a visible sign of inadequate ventilation.

What you can't see is the continuous growth of microscopic fungi, mould and mildew that damages surfaces and materials, giving off harmful allergens and spores which you breathe. Indoor moisture ensures dust mites will thrive and proliferate (see our website).



Now there is an answer... the **CLEA**



**Outdoor air is
Nature's own remedy
and its FREE!**

CLEANAIRE has a wide range of HRVs to control indoor condensation, humidity, pollutants and odours by replacing stale air with fresh warm outdoor air. Each model has two "almost-silent" fans and an "Air-to-Air" Heat Exchanger which recycles heat that is otherwise wasted.

Indoor contaminants and condensation are generated at a small but continuous rate. The HRV provides continuous "trickle ventilation" with fresh outdoor warm dry air. Replacing indoor air once every three hours (8 times per day) ensures that excess moisture and indoor contaminants are diluted away, so the indoor environment is fresh, dry and healthy. Conventional ventilation with windows, louvres and attic fans waste 100% of exhausted energy thus defeating the very purpose of Energy Efficiency Regulations. Building scientists have assessed that effective, conventional winter ventilation adds approx 20% to home energy costs. HRVs pay-back their cost by recycling waste heat.



Model	MA500-67	MA600-77	MB600-95	E100-110-70	E100S-110-70	E200-270-70
Living Space Volume	500m ³	600m ³	600m ³	110m ³	110m ³	270m ³
Power Consumption(L)	60W	60W	60W	12W	12W	20W
Power Consumption(H)	200W	200W	200W	31W	31W	130W
Maximum Efficiency	67%	77%	95%	70%	70%	75%
Dimensions (HxWxD)	520x450x430	520x450x430	560x620x430	190x270x370	318x250x160	270x270x488

The HRV recovers up to 5 times more energy than the energy cost to operate the fans. *What other appliance is 500% energy efficient?* HRVs also save redecoration, furnishing costs and structural damage caused by indoor pollutants, mould, fungi and condensation.

WINTER

Stale indoor air is not only damp, but **warm**. By the natural laws of physics, when cold air is warmed, it becomes dry air. The heat exchanger captures waste heat

CLEANAIRE Heat Recovery Ventilator

from damp polluted exhaust air, then transfers this same heat to the incoming **outdoor air**. Now warm and dry, the **outdoor air** is distributed into your home to provide a fresh, healthy and dry indoor environment. The two air streams are 100% separated at all times.



Simple controls

The HRV is *not* a heater or a heat pump - it **recycles waste heat** from other indoor sources and will dehumidify whenever the outdoor air is colder than indoor air. HRVs perform best when winter conditions are worst. Unlike other condensation control devices, HRVs do not require sunshine, a

warm roof space, or supplementary heating.

HRVs deliver controlled, balanced ventilation 24 hours a day, every day. When there is little or no indoor heat to recover (on warm days and in summer) the HRV continues to provide controlled ventilation from its two (supply and exhaust) fans. Ventilation with fresh outdoor air will ensure "**acceptable indoor air quality**", but for effective condensation control, indoor air must be warmer than outdoor air. The greater the temperature difference (indoors warmer - outdoors colder), the better the HRV will dehumidify the indoor environment.

For air-conditioned homes, the HRV recovers and recycles cooled energy", saving summer energy costs. If the home is unoccupied and secured during the day, leave the HRV **ON**. The **CLEANAIRE** HRV is a "**trickle ventilator**".

Home designs that attract excessive solar heat may require ventilation at many times more than the capacity of the HRV to provide indoor **comfort** (larger model solutions available). For homes that are not air conditioned, and your lifestyle is to have windows open in summer, switch the HRV **OFF**. Optional automatic controls are available.



WHICH HRV FOR YOUR HOME

With 6 ducted and 4 wall models, and 14 other BAXI (UK) models, **CLEANAIRE** has a solution for every home. As important as plumbing for fresh water and sewage disposal, the HRV is *literally a plumbing system* for fresh air supply and stale air disposal. Refer to our website

www.dryair.co.nz or your **CLEANAIRE** supplier for our booklet "**HRVs for IAQ**" which has vital sizing, accessory and other information that is not included here. *This brochure is a "guide only"*.

You will need to study the booklet, then provide your supplier with accurate information – house plans if possible, details of your lifestyle and your expectations of HRV performance. Freephone 0800 DRYAIR for special assistance, or *see our website*.

Once the HRV is selected, the ducting/air distribution system is designed to suit your home. Based on information from you, the **CLEANAIRE** supplier will arrange a detailed quotation for a complete installation or provide a "**Do-It-Yourself**" component schedule and advice (a detailed installation manual is supplied with every model). For limited budgets, first choose the right HRV, install a few ducts, then add more over time. When designing, provide *access and location* space for the HRV and ducting. Note the HRV dimensions. Ducting may be up to 200mm diameter and needs space to install.

HRV's are controlled ventilation systems, designed for continuous balanced ventilation. *Open vented down lights, unplanned combustion air for solid fuel and flued gas heaters, kitchen exhaust fans, clothes dryers and gas heaters affect the HRV and may bypass Building Code Energy Efficiency requirements.*

When designing your home, consider reducing the number of opening windows (just the ones you know *will never* be opened.

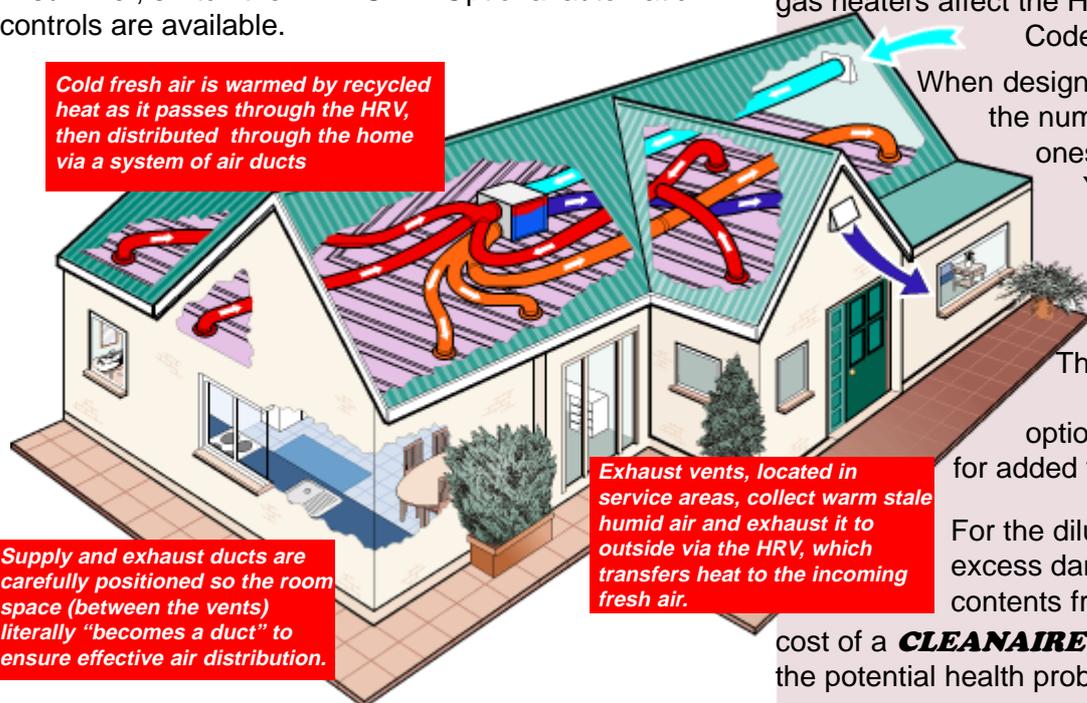
You'll need an HRV performance certificate from your supplier for building compliance). *Savings will contribute to the cost of the HRV.*

The HRV also ventilates bathrooms – a clever "**hot water thermostat**" option automatically boosts fan speed for added ventilation, when hot water flows.

For the dilution of allergens, removal of excess damp air, to prevent your home and contents from abnormal deterioration, the

cost of a **CLEANAIRE** HRV is negligible compared to the potential health problems and material damage costs

Cold fresh air is warmed by recycled heat as it passes through the HRV, then distributed through the home via a system of air ducts

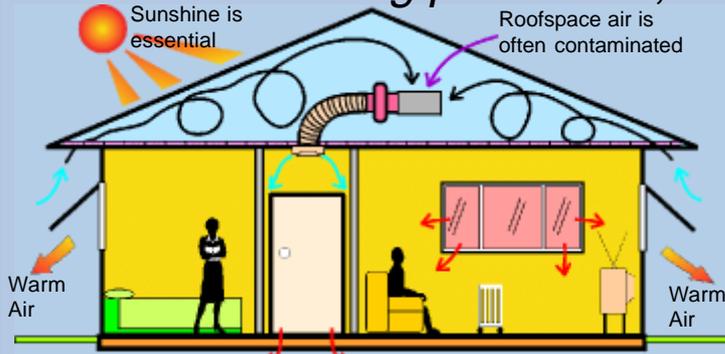


Exhaust vents, located in service areas, collect warm stale humid air and exhaust it to outside via the HRV, which transfers heat to the incoming fresh air.

Supply and exhaust ducts are carefully positioned so the room space (between the vents) literally "**becomes a duct**" to ensure effective air distribution.

The **CLEANAIRE HRV** does a lot

Like a leaking petrol tank, expensive energy is wasted away



ATTIC FANS (waste heat)

● Most Attic Fans **force** “roofspace air” into the home. When sunshine heats roofspace air, it becomes dry and condensation control is achieved, but most condensation occurs at night when homes are occupied, and on cold cloudy days. **In winter when there is no sun, roofspace air is cold and damp (and may be polluted).**

● When an Attic Fan pressurizes a home with roofspace air, how does stale, warm indoor air escape to outside? Unless through a window or other opening, damp, polluted air is forced into wall and other cavities, where it may cause mould, fungi, structural rot and deterioration.

● The **fan motor** of an Attic Fan may cost “cents to run”, but what cost is the warm air (that you’ve paid for), that is forced out of your home by an Attic Fan? An electric air heater to replace heat that is forced from your home has a cost, e.g. a 1000 watt air heater, operated 24 hours per day at 13 cents per unit (kW/hr), will add \$96 to your monthly power bill.

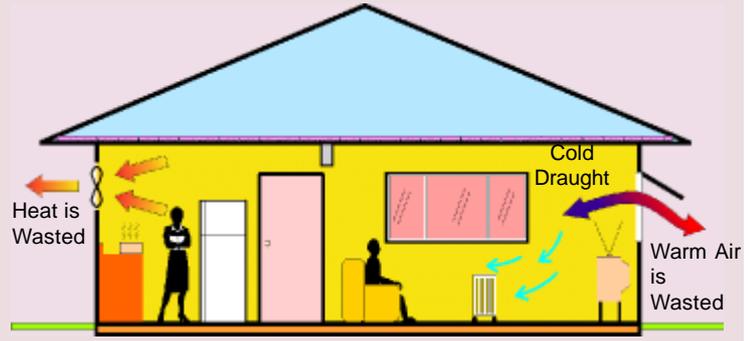
● NZ Standard 4303 “**Ventilation for Acceptable Indoor Air Quality**” specifies “**outdoor air**” for ventilation. **Roofspace air is not outdoor air.**

● Roofspaces are often the home and toilet facilities for mite infested nesting birds, rodents, spiders, dust mites, ants, cockroaches, etc. Droppings litter roofspaces. Warm, dark, damp places incubate mould and fungi. Rodent urine contains a potent allergen which becomes airborne when dry. Rodents, birds, insects etc. die in roofspaces. Their carcasses and droppings decay and mould. Referred to overseas as “**the asbestos of the future**”, moulds are allergens, *even when dead*. Undetectable and measuring less than 2 microns diameter, dust mite allergens, bacteria, moulds, fungi, insulation dust and odours pass right through a “2 micron pollen media” air filter.

● Roofspace air may be dry, odourless, tasteless and reduce indoor window condensation, but it is not fresh clean **outdoor air**.

Inspect your roof space through the manhole. Can you guarantee it is not, or never will be, polluted up there? Your lungs will breathe whatever air you supply them - polluted or fresh.

● **How do we know about Attic Fans?** We first manufactured the CLEANAIRE FORCED AIR VENTILATION SYSTEM (as illustrated above) in 1983.



EXHAUST FANS and OPEN WINDOWS (waste heat)

● In winter, an exhaust fan wastes heat energy by exhausting warm air. The fan may cost cents to operate, but to replace the heat that is exhausted when the home is *effectively ventilated*, can add \$60 to \$100 to your monthly energy bill.

● In a modern home, for the exhaust fan to function properly, an opening for fresh replacement air to enter the home is required (a window or vent). Exhausted air is replaced by fresh, cold, **outdoor air** that has to be heated by your home heating system. Open windows or window vents **is uncontrolled ventilation** ...too much, or not enough and **wasteful**. Exhaust fans and opening windows *defeat the very purpose of an energy efficient home*.



AIR FILTERS

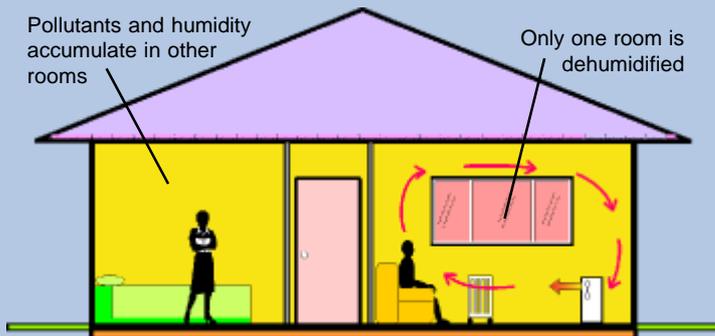
In areas where outdoor air is clean and suitable for ventilation, air filtration may be unnecessary. However, if pollens, hayfever allergens or odours are present, then air filtration may be as important as the need to ventilate with fresh outdoor air.

*Airborne dust particles are measured in microns. More than 1500 influenza bacteria will fit on this 620 micron dot (.). A grain of table salt is 100 microns. Talcum powder is 8 microns. Dust in a shaft of sunlight is 50 microns. Visible dust particles make up only 10% of airborne dust. We cannot see dust particles 10 microns or less. Each “breath of air” contains approximately 70,000 invisible dust particles. Each day our lungs respire over 22,000 times and are subjected to a barrage of over **one billion** airborne dust particles.*

***Ventilation by Dilution** (as with an HRV with no air filter), effectively reduces indoor concentrations of minute contaminants and allergens, e.g. particles of influenza, parvovirus, rhinovirus and measles, are all smaller than 0.1 micron.*

more than “control condensation”

Dry doesn't mean fresh.



DEHUMIDIFIERS (do not ventilate)

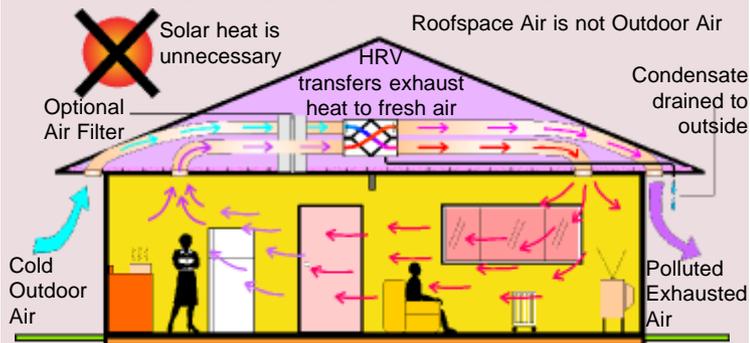
● A domestic dehumidifier is a variation of a common refrigerator. A fan **recirculates** warm moist room air over chilled metal plates inside the dehumidifier. Humidity condenses on the metal plates, in exactly the same way that humidity condenses on the outside of a cold drink-can or glass. Condensation dribbles from the chilled plates into a bucket and you feel good when you empty the full bucket of water. Here's what you may not know.....

● A dehumidifier removes moisture by **recirculating** room air. If the air is stale, odorous and polluted, the dehumidifier will remove the moisture, but nothing else. In fact, if the room is occupied while the dehumidifier is in operation, indoor contaminants increase. **Recirculating** foul air “stirs up” pollutants such as dust mite allergens.

● Claims that dehumidifiers control dust mites in normal home use are incorrect. In an average New Zealand home, one dehumidifier makes little difference to dust mite populations. NZ Standard 4303 “**Ventilation for Acceptable Indoor Air Quality**” recommends whole home ventilation (with fresh **outdoor air**) at the rate of one air change every 3 hours. A recirculating air dehumidifier contributes nothing to ventilation needs. Many dehumidifiers are noisy, and scientific tests have identified that unless appropriately disinfected, the *inaccessible* cooling plates, water buckets and surrounds of dehumidifiers support and encourage the growth of harmful moulds, fungi and bacteria.

*Like a heartbeat, lungs are often taken for granted and breathe whatever air we “serve up”. But nothing else matters when you can't breathe. Lung tissue is fragile and easily damaged. If you need an air filter, choosing the right filter is critical. For example, common “woven media” filters are graded from EU1 to EU12. An EU4 “pollen” filter only “holds” pollen grains larger than 2 microns. Harmful bacteria, mould, fungi and roof insulation dust (smaller than 2 microns) pass right through a 2 micron “pollen” filter. **FACT:** 99% of all airborne particulate is smaller than 1 micron.*

Here's how it works....



HEAT RECOVERY VENTILATOR (HRV) (ventilates, dehumidifies and recycles waste heat with doors and windows securely shut)

● **CLEANAIRE HRVs** are designed to ventilate homes with 100% fresh **outdoor air** at the rate recommended in NZ Standard 4303 “**Ventilation for Acceptable Indoor Air Quality**” i.e. one air change every 3 hours. Each model has two ultra-quiet fans, one to **exhaust** stale humid air and another “**supply fan**” to replace exhausted air with dry warm **outdoor air**. Heat from the warm exhaust air stream is “captured” by a heat exchanger and **recycled** to preheat the incoming cold, fresh **outdoor air**. The fresh outdoor air becomes dry when it is warmed by the heat exchanger.

Introducing fresh, warm, dry air into your home **evaporates and controls condensation** (similar to a motor car windscreen warm air demister, or hair or clothes dryers).

● Polluted, damp indoor air is continuously exhausted and replaced by 100% fresh **outdoor air**. Excess humidity is positively exhausted to outside with the foul air and, in some conditions, humidity condenses on the heat exchanger plates (exhaust side only) to be disposed of by the HRV drain.

● Continuous **trickle ventilation** with fresh, warm **outdoor air** dilutes indoor air contaminants, which are positively removed by the exhaust fan. The result is an indoor environment that is always fresh and healthy.

● The **CLEANAIRE HRV** performs best when winter conditions are **at their worst**, day and night. In an average (heated) home, additional heat (or sunshine) is unnecessary.

CLEANAIRE HRV's continuously :-

- 1) Reduce humidity and remove condensation
- 2) Exhaust stale humid polluted air
- 3) Replace stale air with fresh dry warm outdoor air
- 4) Transfer waste exhaust heat to incoming fresh air
- 5) Transfer heat (i.e. from log burner) around the home
- 6) Saves up to 5 times more energy than it costs to run
- 7) Reduce **greenhouse gas** emissions, by recycling energy.

WARRANTY: To original customer – Heat Exchanger “Core” – 5 years. Fans, motors and speed controller – 2 years **free service**. Full conditions are in “**HRVs for IAQ**”, supplied with each HRV and at www.dryair.co.nz

Easy-to-use **CLEANAIRE** Accessories

For Contractor Installation or "Do-It-Yourself"

AC1 Gable end Weather-hood with 100mm long Spigots for 150 or 200mm ducting.

AC2 Ceiling ducting "terminals" 100mm, with in-built damper. Also 150 and 200mm models.

AC3 Soffitt "terminal" with vermin mesh (or indoor exhaust terminal) 150, 200mm.

AC4 Insulated Ducting (flexible) 3 metre lengths, insulated and uninsulated. 100, 150, 200mm.

AC5 Duct Splitter

3-way, 4-way, 200mm diameter to 150mm or 100mm. Specify your requirements.

AC6 Duct Damper, 100, 150, 200mm (specify).

AC7 Wall Grilles, and manual or motorised dampers. Wide range available (specify).

AC8 Hot Water Thermostat, Model AS with Accessible Sensor or Model IS (low cost) Inaccessible Sensor pocket.

AC9 Suspension Spring Mountings (4 springs).

Alternative to sponge rubber mounting kitset (supplied).

AC10 Hygrometer Dial Humidity Meter



For the DIY handyman, detailed installation information, including ducting design layouts is in our booklet "HRVs for IAQ". All ducted model HRVs are supplied with a detailed and illustrated 48-page installation manual and supplementary advice is available on 0800 DRYAIR.

AIR FILTER OPTIONS

Before buying an air filter, identify the reason you need one, then purchase the correct air filter to solve the problem.

For "media filters", the replacement "media" size affects the maintenance interval and cost.

AF1 Basic Media Filter (.3m² surface area). Specify EU1 or EU4 media.

AF2 Basic Media Filter with supplementary carbon (odour) air filter (.3m² surface area).

AF3 Basic Media Filter (.4m² surface area).

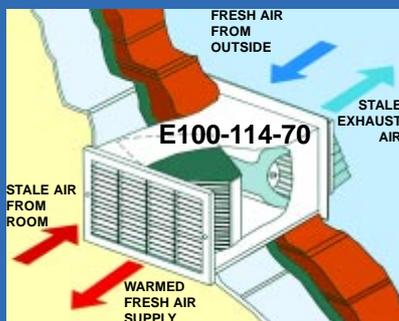
AF4 Basic Media Filter EU1 or EU4 (.4m² surface area) with supplementary carbon (odour) air filter.

AF5 Electrostatic Air Filter.

AF6 Electronic Air Filter.

AF7 Ultra-violet Air Steriliser.

AF8 H.E.P.A. High Efficiency Filter (captures 99.5% of all particulate). 5 models.



www.baxi.co.uk

AVON are Sole Agents for BAXI UK. With 19 models which include 14 wall models (for where ducting is impossible). Ultra-quiet and suitable for offices, bathrooms, bedrooms and smaller homes. Awarded the prestigious "Seal of Approval" by the British

Asthma Foundation, after independent tests proved asthma relief. Tested and recommended by Dr John Maunder, Director, Entomology Department, Cambridge University.

To find your nearest **CLEANAIRE** supplier or for advice and information telephone:

0800 DRYAIR
0800 379247

CLEANAIRE HRVs are manufactured by Avon Electric Ltd, Christchurch, New Zealand. First established in 1952, Avon's motto is "improving lifestyles". Avon are known throughout New Zealand and Australia as specialists in Electric Heating and Engineering, Dehumidification, Dryers, HVAC Ventilation and Energy Recovery. Avon first manufactured HRVs in 1983. Our largest dryer (6,500kW) evaporates 90 tonnes of water every day. In these and other fields of energy efficient and innovative design, manufacturing and importing, our experience is unmatched.