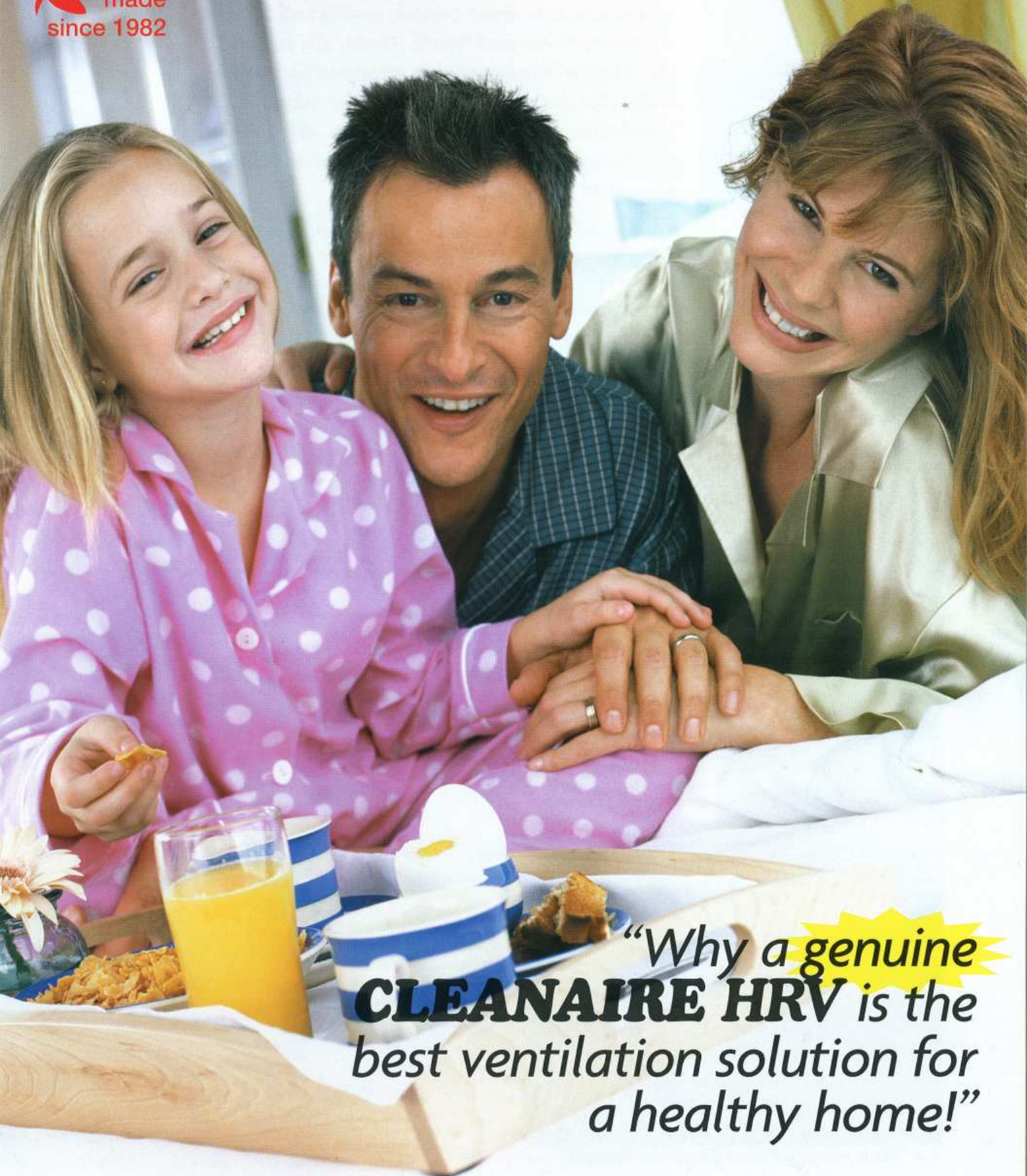


CLEANAIRE - The **Genuine** Heat Recovery Ventilator (HRV)

 NZ
made
since 1982



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

The importance of Indoor Air Quality (IAQ)



"Wrapped and sealed in a barrier."

The Building Code 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!



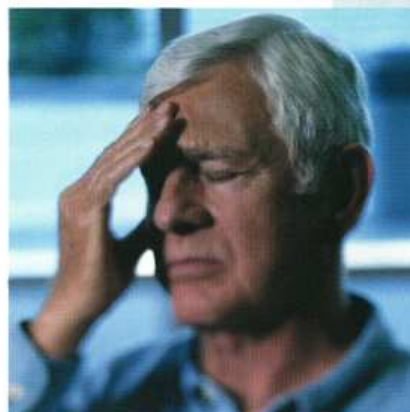
Common household items such as paints, polishes, cleaners and disinfectants, furnishings, wallpaper, varnishes and plastics leach Volatile Organic Compounds throughout the home. Aerosol particles are readily inhaled. Children have higher breathing rates and inhale proportionately more lung damaging VOCs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



See "This is your Child" www.drrapp.com (allergies)



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?



Water... 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 not via a dusty and polluted roofspace**. 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%.



Dust Mite magnified 200 times.

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).



No other ventilation system can match the proven record of the



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

Genuine 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 **CLEANAIRE** HRV provides continuous "trickle ventilation" with fresh outdoor warm dry air. Replacing indoor air once every three hours (8 times per day) ensures that excessive 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, and doesn't prevent serious damage by mould and mildew to window sills, wall paper, drapes, furnishings and the structure of your home.



Model	MA400-80	MA600-80	MB600-95	HR100W-110-70	HR100S-110-70	HR200WK-270-70
Living Space Volume	400m ³	600m ³	600m ³	Currently N/A	Currently N/A	Currently N/A
Power Consumption (low)	20W	40W	40W	Please Enquire	Please Enquire	Please Enquire
Power Consumption (high)	40W	90W	90W			
Efficiency (sensible latents)	80%max	80%max	95%max			
Dimensions (HxWxD)	325x536x430	510x690x425	535x845x425			

Note: remove duct spigotts & access door to reduce dimensions. (inquire for details)
Enquire for other specialised and larger capacity Avon / CLEANAIRE models.

Since producing the first (NZ) genuine home HRV in 1982, **CLEANAIRE** has perfected the "Crossflow" Heat Exchanger, to suit the NZ climate. What other home ventilation system recovers and recycles up to 800% more energy than it costs to operate, in normal domestic service? Others may imitate, or advertise with words that confuse, but **CLEANAIRE** is a genuine HRV.

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 fresh and exhaust airstreams are separated at all times.



Simple controls

The **CLEANAIRE** 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.

SUMMER

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 ON/OFF controls are available.



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.

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

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



WHICH HRV FOR YOUR HOME

With multiple ducted model variations, **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 sizing information that is not included here. *This brochure is a "guide only".*

You will need to 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 - www.dryair.co.nz*

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.

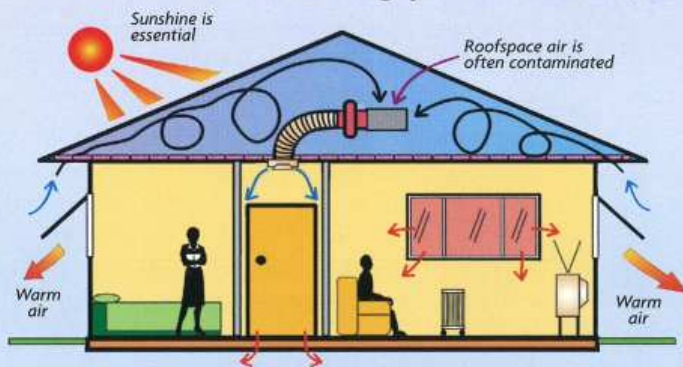
HRV's are controlled ventilation systems, designed for continuous balanced ventilation. *Open vented down lights, unplanned combustion air for solid fuel and flued gas heaters, kitchen exhaust fans, clothes dryers and gas heaters* affect the HRV and may bypass Building Code Energy Efficiency requirements.

When designing a home, delete those opening windows that you know will never be opened. (Convert them to fixed windows). The savings will pay for the HRV. Your **CLEANAIRE** supplier will provide ventilation Compliance Certificate ("Producer Statement"), for your Local Authority. The **CLEANAIRE** HRV can also ventilate bathrooms, ensuites, and toilets, making other fans unnecessary. An optional "**hot water thermostat**", automatically boosts fan speeds to increase ventilation rates whenever hot water is used.

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 caused by inadequate ventilation.

The **CLEANAIRE** HRV does a lot

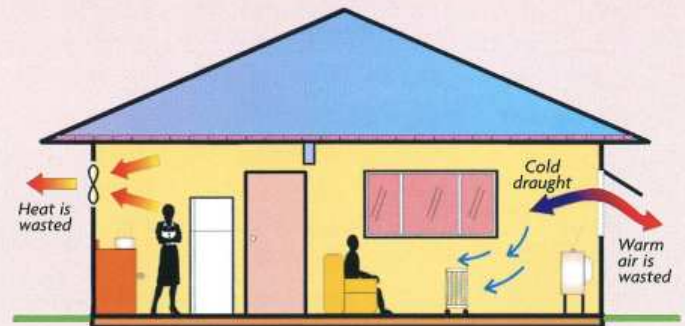
Like a leaking petrol tank, expensive energy is wasted away.



ATTIC FANS (waste heat)

- When installed as above, Attic Fans **do not comply with the ventilation requirements of the NZ Building Code**. On cloudy days, and at night (whenever there is no sun), roofspace air is cold and damp, and may be contaminated by vermin, insects, birds etc.
- 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, eg. a 1000 watt air heater, operated 24 hours per day at 23 cents per unit (kWh), will add \$165 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 and 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 an HRV's?** We first manufactured the CLEANAIRE FORCED AIR VENTILATION SYSTEM (as illustrated above) in 1978 and the first (NZ) home HRV in 1982.



EXHAUST FANS and OPEN WINDOWS (waste heat)

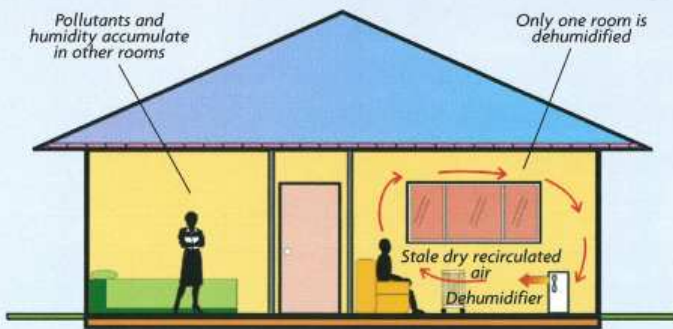
- In winter, an exhaust fan wastes heat energy by exhausting warm air. The fan may cost cents to operate, but to replace the heat that is exhausted when the home is *effectively ventilated*, can add \$80 to \$150 to your monthly energy bill.
- In a modern home, for the exhaust fan to function properly, 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

- 1) Common air filters are known as "media air filters" and in general terms graded from 1 to 20. NZ outdoor air is relatively clean. The higher the grade the better the air filter, but more frequent the need for service, and maintenance costs. CLEANAIRE only supplies outdoor air to the home, simple air filters are sufficient to prevent larger pollens and particulate from entering the home.
- 2) CLEANAIRE HRV's have integral No 3 Grade washable air filters, one for the outdoor air and another for the exhaust air, (which eliminates the need to clean the Heat Exchanger). Each is suitable for up to 10 "washes"; and will remove larger pollens and common outdoor dust. "Wash" annually -- takes approx 10 minutes.
- 3) Higher grade particulate air filters are required if occupants suffer from Hayfever, or if outdoor air contains excessive volumes of dust or particulate. No 4 or 5 filters (as used in Food Factories) are usually sufficient. **Over specified air filters are unnecessary and require more frequent filter maintenance, and expense.**

more than "control condensation"

Dry doesn't mean fresh.



DEHUMIDIFIERS (do not ventilate)

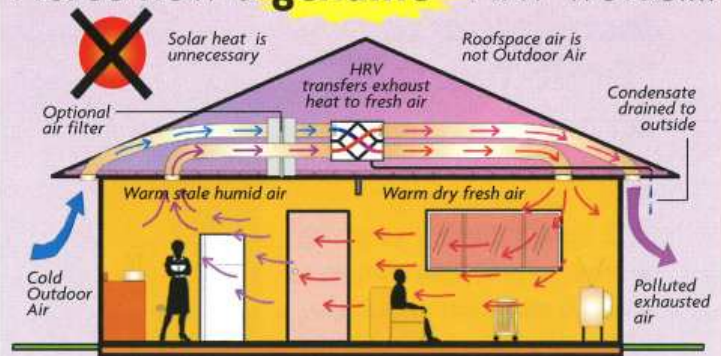
- A domestic dehumidifier is a variation of a common refrigerator. A fan **recirculates** warm moist room air over chilled metal plates inside the dehumidifier. Humidity condenses on the metal plates, in exactly the same way that humidity condenses on the outside of a cold drink-can or glass. Condensation 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.

4) If outdoor air is polluted by odours from woodsmoke, or industrial or motorway fumes etc, an odour control air filter is necessary. Carbon Filters absorb odours from installation until "saturated", (typically lasting 4 to 6 months).

5) for 3) or 4) above, the CLEANAIRE "Quikfit" is a simple but effective system which can accommodate all the filters described in 3 & 4. Inquire for details.

6) For more specialised air cleaning systems see page 8, & inquire for details.

Here's how a **genuine*** HRV works....



HEAT RECOVERY VENTILATOR (HRV) (ventilates, dehumidifies and recycles waste heat with all 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**" *ie.* 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 (*ie.* from lounge log fire) around the home
- 6) Saves up to 8 times more energy than it costs to run
- 7) Reduce **greenhouse gas** emissions, by recycling energy

*** WARNING:** Don't be fooled by imitations! A genuine HRV must have 3 key components... 1) a supply fan, 2) an exhaust fan, 3) an energy exchanger. Otherwise **it is not an HRV!**

WARRANTY: 6 years, plus an additional 4 years on the Heat Exchanger. Warranty detailed @ www.dryair.co.nz, or inquire for a copy.

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 Soffit "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, (boosts fan speeds when showers etc are used, and can replace bathroom exhaust fans). Select AC8-AS or AC8-IS, (Inquire from supplier for advice)

AC9 Suspension Spring Mountings (4 springs). Alternative to sponge rubber mounting kitset (supplied).

AC10 Hygrometer (Humidity Gauge).

AC11 Drain outlet, 16mm outside dia.

AC12 Control Panel (supplied with HRV)

For the DIY handyman, all ducted model HRVs are supplied with a detailed and illustrated 48-page installation manual and supplementary advice is available free by calling 0800 DRY-AIR

CLEANAIRE Control Panel :- NZ Standard 4303:1990 "Ventilation for Acceptable Indoor Air Quality" specifies continuous (home) ventilation at not less than .35 Air Changes per Hour, (ACH).

In winter, to exceed .35 ACH is unnecessary and wastes valuable energy.

Ventilation rates less than .35 ACH does not comply with NZS4303:1990. Ventilation Systems which automatically reduce fan speeds may not comply with NZS4303:1990.

The **CLEANAIRE** Control Panel is deliberately simple for reliability, (6 year warranty), and to provide continuous compliance with the rates specified in NZS4303:1990, and ensures indoor air is always healthy, fresh, & dry.



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 (.4m² surface area). Specify EU1 or EU4 media.

AF3 Basic Media Filter EU1 or EU4 (.4m² surface area) with supplementary carbon (odour) air filter.

AF4 Basic Media Filter with supplementary carbon (odour) air filter (.3m² surface area).

AF5 Electrostatic Air Filter

AF6 Electronic Air Filter

AF7 Ultra-Violet Air Steriliser

AF8 H.E.P.A High Efficiency Filter (captures 99.9% of all particulate). 5 models.

CLEANAIRE HRVs are manufactured by Avon Electric Ltd, Christchurch, New Zealand. First established in 1939, Avon's motto is "improving lifestyles". 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 1982. 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. www.avonelectric.co.nz

See the **TOYOTOMI** whole house heating system www.avonheating.co.nz

Your supplier is: