

# moistureMASTER<sup>tm</sup> Pure Air Module

**Nature's purifier has been captured in a tube replicating what nature has been doing for millions of years!**

**Smell the air after a thunder storm or around rushing water such as a waterfall. That's the quality of air that the Pure Air Module puts into your home.**

Dual wavelength high purity quartz lamps produce ultraviolet rays at 253.7nm and small controlled amounts of ozone ( $O^3$ ) at 184.9nm. The UV acts as a sterilizing agent for air that passes through the ventilation system and ozone being a gas has a powerful effect on contaminant particles within the home.

## How Do Ozone Purify the Air?

Natural oxygen that we breathe has two oxygen atoms ( $O^2$ ) and when the light waves at 184.9nm are applied to the air the oxygen atoms are broken apart. Quickly these atoms hop back together in threes ( $O^3$ ). You have heard the expression that "two's company and three's a crowd" well this aptly describes this "unnatural" union. The atoms want desperately to dissolve this uncomfortable trio so as the ( $O^3$ ) molecules float in the air if one of the atoms spots a contaminant molecule it breaks away from the other two atoms and attaches itself to the contaminant. This attachment is actually an attack on the contaminant and changes its structure. Through a process of oxidation both the contaminant and the atom are destroyed. This leaves the other two atoms behind as pure oxygen ( $O^2$ ) without the presence of the contaminant. The contaminants are converted into carbon dioxide and hydrogen which we can safely breathe.



## BENEFITS

- **Removes pollutant odours and smog.**
- **Kills mould and mildew spores.**
- **Removes contaminant particles.**
- **Enriches your home with healthy air.**
- **Charges your home with health promoting negative ions.**
- **Does what filters can't do.**

## How Does Negative Ions Purify the Air?

The ozone also produces negative ions which are simply oxygen ( $O^2$ ) atoms that have gained an electron. By gaining or losing electrons nature provides both positive and negative ions in abundance. But when it comes to feeling good, it is the negative ions that are important. Negative ions are the **good guys**. They attach themselves to airborne particles such as dust, pollen, smoke and dander, causing them to drop out of the air. They purify the air by magnetically attracting pollutants. These pollutants "stick together" forming new larger particles which become too heavy to remain in the air that we breathe. The Purifier continually produces negative ions, so even if one of these fallen particles is kicked into the air, it is quickly removed again. These fallen particles are typically collected by normal cleaning activities. The most important thing, though, is that they are taken out of the air, preventing you from inhaling them into your lungs, which is how they cause problems.

With air that is charged with negative ions your home will be invigorated and healthy!

## WHY IS OZONE GOOD FOR OUR HOMES?

Modern, "air-tight" construction methods that began in the energy-conscious 1970s, combined with misinformation about ozone safety perpetuated by well-meaning public health agencies, has resulted in an unfortunate lack of ozone in most indoor environments. The reason this is so unfortunate is because in truth ozone is an effective, natural air purification agent which, when properly produced by a high-quality air cleaning system, can alleviate a wide range of health problems such as allergies, asthma, sinus problems, and chemical exposure.

## Ozone Good or Bad?

You may have heard that ozone is dangerous. Although some groups claim that ozone is harmful, proof of its safety and effectiveness at moderate concentrations has prevailed in multiple hearings before the FTC (Federal Trade Commission). Millions of ozone air purifiers have been sold in the United States over the years, but there are no specific cases where an ozone air cleaner has been linked to any kind of harm or injury. However there is definitely a distinction in two manmade methods of producing Ozone.

### Man-Made Ozone: Corona Discharge

The "lightning method" of ozone production has been duplicated commercially by many manufacturers of ozonating air purifiers and is known as **corona discharge**.

In this method, 5,000 to 10,000 volts of electricity is used to split the O<sup>2</sup> atoms to produce ozone. However, in addition to safety concerns and high operating costs, air purifiers utilizing the corona discharge method are plagued by unpredictable levels of ozone production -- ozone "blasts" -- and also produce undesirable and unhealthy byproducts such as nitric oxides. These oxides actually irritate the respiratory system -- not what you want in an air purifier. So in spite of claims that these units give you a "thunderstorm in a box," they have clear drawbacks.

#### Pros:

Low capital cost. Ozone effective on odours, bacteria, VOC's (Volatile Organic Compounds) and mould.

#### Cons:

Air is 80% Nitrogen and 20% Oxygen. These units convert Oxygen to Ozone. They also convert the Nitrogen to Nitric acid and Nitric Oxide, which causes maintenance problems due to corrosion. They produce high concentrations and levels of ozone, usually over the safe limits and airborne Nitric Oxide. These systems typically will require expensive monitors to control ozone levels. Also arcing (sparking) can be a noise and safety problem.

### OZONE EFFECTIVENESS

Here is a partial list of the hundreds, if not thousands, of things that ozone can be effective against.

Animal Odours	Carpet Odours	Fertilizer	Aged Manuscripts
Viruses	Exhaust Fumes	Moth Balls	Poultry Odours
Cigarette Smoke	Sewer Gases	Onions	Industrial Wastes
Paint Odours	Rancid Oils	Butane	Kerosene
Gangrene	Mildew	Menthol	Decaying Odours
Formaldehyde	Bacteria	Garbage Odours	Ether
Gasoline	Cooking Odours	Combustion	Resins
Medicinal Odours	Lactic Acid	Hospital Odours	Toluene
Germs	Ammonia	Dead Animals	Garlic
Mould	Diesel Fumes	Algae	Acetone
Asphalt Fumes	Flood Odours	Lubricating Oils	Acrylic Acid
Bathroom Smells	Carbon Monoxide	Charred Materials	Faecal Odours
Body Odours	Tetrachloride	Odours	Carbolic Acid
Fire Odours	Furniture Odours	Benzene	Fungi
Adhesive Gases	Burned Food Odours	Fish Odours	Chemicals
Coal Smoke	Propane	Ethyl Alcohol	Creosote
Alcohol	Anaesthetics	Nicotine	Food Odours

### How successful is the Pure Air Module?

*We installed a Moisture Master home ventilation system to prevent condensation and keep our home fresh and dry but found that on calm cold nights or when there was a frost we would get a strong smell of smoke throughout the house from neighbourhood fires. The Pure Air Cassette was very successful in preventing this from happening. The air in the house is clean with no smell at all. Thanks to Condensation Control and their innovation we are very happy!*

**Sharon Price, Dunedin**

### Man-Made Ozone: Ultraviolet Light

Short-wave solar ultraviolet radiation **ultraviolet light** is another method used by many air purifier manufacturers. When ultraviolet light rays collide with a contaminant such as carbon monoxide (CO) and nitrogen oxides (NO<sup>2</sup> and N<sup>2</sup>O) in the presence of oxygen (O<sup>2</sup>), ozone is produced.

UV lamps in the 185nm range produce low-level ozone, just as the sun does, which is very effective in odour microbial reduction and VOC's.

#### Pros:

Low capital cost, easy installation, and effective on mould, smoke, odours and bacterial. The ozone gas travels through the house to provide ongoing treatment.

#### Cons:

**None.** Ozone is a concern to some people. The Ozone that is produced by the ultraviolet light incorporated in the Pure Air Cassette will only produce a fixed amount of ozone. This is strictly controlled by the size of the lamp and produces ozone at levels that are safe and effective. Also and more importantly ozone generated by these lamps do not produce the irritating and corrosive Nitric Oxide or Nitric Acid that has given Ozone a bad image.

# Indoor Air: Sweat the Small Stuff

## Microscopic Airborne Particles Kill People Every Day

You don't have to be able to smell or see air pollution to die from it or be adversely affected by it. A study of USA's 20 largest cities confirms that small amounts of particles less than one-fifth the width of a human hair are enough to raise the death rate. And the death rate climbs steadily along with the number of these fine particles. The study, conducted by researchers at the Johns Hopkins School of Public Health, supports Environmental Protection Agency standards that were set in 1957 and revised in 1997, said Bob Perciasepe, EPA assistant administrator for air quality.

The findings should squelch criticism that earlier research at the EPA, Harvard and elsewhere was inconclusive said James H. Ware, Dean of the Harvard School of Public Health. Perciasepe said the study shows that the fine particles, and not the weather, certain chemicals or other factors, drive increases in the daily death rate. The study, published in today's New England Journal of Medicine, looked at death rates and at the amount of "fine particulate pollution" -- that is, particles less than 10 micron across. A micron is one-thousandth of a millimeter. Such particles come from just about anywhere - cars, power plants, construction and agriculture. The study deals in amounts almost staggeringly small: *micrograms* - ten millionths of a gram or about four-ten-millionths of an ounce - per cubic meter of air. Under EPA rules, the maximum allowable level of 10-micron particles in 24 hours is 150 micrograms per cubic meter. All 20 cities averaged levels of one-third or less of the maximum. For each 10 micrograms of particles per cubic meter of air over a 24-hour period, the death rate from all causes rose just more than one-half of a percentage point, researchers said. To put it another way: If you take a large city where about 100 people die each day and the fine particle pollution rises by 20 micrograms per cubic meter over 24 hours, you can add one death to the daily rate. If it rises 40 micrograms, you can add two deaths.

Los Angeles averaged 148 deaths a day from 1987 through 1994. New York averaged 190.9, and Chicago 113.9.

The EPA rules on fine particulate pollution are now before the Supreme Court but the findings have no direct bearing on the case. The main question is whether pollution regulations must consider the costs of compliance.

*Associated Press 2003*

It is no secret that the burning of fossil fuels causes air pollution and adversely affects the health of the human population. Over the last 10 years, research has been providing new insight about the health consequences of particulate air pollution. Generated by the use of fossil energy, respirable-sized particles pose a major threat to our environment and health. Other common particulates that also have significant effects on our health include pollen and mould spores.

### Did you know?

- The average home collects about nearly 800 grams of dust per week.
- Visible particles constitute only about 10% of indoor air.
- Particle visibility depends on the eye itself. In other words, light intensity and quality, background and particle type.
- Particles on furniture and those in a shaft of light are approximately 50 microns or larger.
- It may be possible to see particles as small as 10 microns under favourable conditions.
- Particles of 1 micron or less adhere to surfaces by molecular adhesion. Scrubbing is generally the only way to remove them.
- Larger particles tend to settle out of the atmosphere due to weight.
- Smaller, "respirable" particles remain suspended in the air virtually indefinitely - until breathed in.
- Approximately 98-99% of all particles by count are in the size range of 5 microns or less. These particles tend to remain in suspension or settle out so slowly that only quality electronic air cleaners and HEPA air cleaners are effective in removing these particles.
- The majority of harmful particles are less than .3 microns in size. (That's smaller than a HEPA filter can remove from the air).
- The average person breathes in about 4,000 litres of air per day. Each quart contains some 17,500 visible and invisible particles. That's over a billion particles per day that our lungs have to filter out!
- A 12sq meter carpet or rug will collect an average of about 2.2 kilograms of dust per year!
- 100% of all respiratory ailments and disease are caused by inhaled particulate. That's right, 100%.
- Consider this: If your immune system has to work so hard to protect your body from the air you breathe, how can it protect you from anything else?

**The Pure Air Cassette will deal to particles that filters can't touch!**

# Tiny Fuel Particles Cause Heart Attacks

## Microscopic Airborne Particles Kill People Every Day

Tiny air-born particles released by burning fossil fuels are reducing the average human life span across Europe and North America by eight months, a leading research body said.

Studies showed that the particles are a major cause of heart attacks, one of the world's biggest killers, a scientist from an Austrian-based research body told a UN news conference.

"We always knew that they had an effect on the respiratory system, but now we know that they spark cardiovascular disease by inflaming the heart membranes," said Markus Amann of IAASA, the International Institute of Applied Systems Analysis. Power stations, road traffic, steel and cement plants and even wood-burning in country areas contribute to the build-up of the particles, he added. Amann was speaking in advance of a conference in Geneva of the UN's Economic Commission for Europe (ECE), which is expected to set up an expert team to look at the problem. The conference also marks the 25<sup>th</sup> anniversary of a pact on reducing cross-border air pollution, which has helped remove relatively heavy pollutants like sulphur from the atmosphere.

The fossil fuel particles that cause heart attacks, however, are light and can travel some 1,200 to 1,900 miles on air currents.

Reuters 30/11/2004

## LOW LEVEL OZONE IS ONE WAY TO GUARD YOUR HOME AGAINST THESE TINY FUEL PARTICLES

### SICK BUILDING SYNDROME

#### What is sick building syndrome?

Sick building syndrome is the result of an indoor air contamination problem sometimes caused by mould.

#### What are the symptoms of SBS?

The usual symptoms include eye, nose and throat irritation, headaches and fatigue. The symptoms usually dissipate once occupants have left an infected building.

#### What causes SBS?

Some microorganisms negatively affect the body. To date, research has shown two fungi, Penicillium and Stachybotrys, have been linked to this syndrome. These fungi (mould) usually grow and cause air problems when building materials, such as walls and carpets, become wet. Combined with a dirty environment, the deadly fungi grow.

#### What can I do to prevent SBS from occurring?

Make sure your home is weather-proofed as much as possible to reduce humidity inside the house. A mechanical ventilation system is the best method of maintain indoor humidity at healthy levels. Use continuous low levels of ozone to combat and retard the growth of deadly mould.



Available From:

Condensation Control Ltd

47 Rankeilor Street, Dunedin

Telephone: (03) 455 1140 Fax (03) 455 1141



### SPECIFICATIONS:

#### HUV-170 (Single Lamp)

Lamp Size	170mm long
Power Consumption	10 watts
Lamp Life	15,000 hours

#### HUV-200 (Dual Lamp)

Lamp Size	200mm long
Power Consumption	20 watts
Lamp Life	15,000 hours

Freephone 0800 866 855

email: [info@condensation.co.nz](mailto:info@condensation.co.nz) website: [www.condensation.co.nz](http://www.condensation.co.nz)