



External Research Paper for Greenseal accreditation



**ENVIRONMENTAL &
HUMAN
HEALTH IMPACT**

Environmental and Human Health Impact Assessment

Priority environmental and human health impacts associated with products in the category of air fresheners, filtration systems and odour inhibitors:

Environmental Impacts:

- **Batteries.** Many filtration and scenting products utilise batteries as a power source. Not all battery types are categorised as hazardous waste, but often waste contractors treat all consignments as hazardous and additionally when disposing of batteries, they must be segregated to avoid consigning all as hazardous waste.¹ This is not common consumer knowledge so even when it is possible to recycle batteries, they are disposed of in landfill.
- **Aerosol canisters.** Within scenting systems aerosols are extremely common as they are one of the most cost-effective means of dispersing a scent. Despite the phasing out of CFCs, aerosols still make use of propellants containing hydrocarbons and VOCs which contribute to greenhouse gas emissions and climate change.² It is not possible to recycle canisters unless they are completely void of their contents, which can be challenging and time consuming. As a result of this incomplete use and therefore waste, there is increased production that leads to increased packaging, transportation, use and disposal.
- **UV and Ozone.** Some air filtration systems make use of UV as a supposed means of neutralising airborne pathogens. Also, air purifier manufacturers do not usually explain what kind of UV technology they use, and some of these technologies produce high volumes of ozone again contributing to climate change. Furthermore, some types of UV lamps, especially those that are classified as 'germicidal' contain mercury which can be extremely detrimental to ecosystems, through bioaccumulation, if released into the environment.
- **Ionisers.** Another commonly used air filtration mechanism is through the use of ionisers. Through their action they increase the likelihood of oxygen molecules bonding to create ozone.³
- **HEPA air filters** contribute to large waste pollution and environmental damage. HEPA filters are not recyclable, most will live their days in landfills alongside trash.
- **Two Pole Active (TPA)** technology is an **active filtration technology**, which is different from HEPA **passive filtration technology**. Electrical Voltage generates high energy plasma is not sustainable or economical due to the high voltage electrical power it requires to be effective.

Human Health Impacts:

- **Ozone.** As a product of ionisers, UV air filters and ozone generators, ozone has been shown to cause a multitude of detrimental human health impacts particularly on the respiratory and cardiovascular systems. Some of these impacts include chest pains, aggravation of asthma, decreases in lung function and a higher susceptibility to infection.⁴
- **VOCs.** VOCs are ubiquitous to fragrances, and are in fact equally as, and often more, common in fragrances made from naturally-derived compounds such as essential oils. Therefore, all products that release a scent will release VOCs.⁵ Furthermore, when expelled from the vessel some of the fragrance compounds react with ozone in the air to form secondary pollutants including formaldehyde which is a known carcinogen.⁶
- **Sick Building Syndrome (SBS).** SBS is a physical reaction to multiple low-level contaminants which typically affects office workers and can cause respiratory issues. The air indoors can be up to five times more polluted than outside with pathogens, mould, pollen, dander, dust from carpets, emissions from printers etc.⁷ Air filtration/purification systems are in common use in workplaces due to these potential health impacts but, as mentioned above, they can in fact exacerbate the problem by contributing to the level of indoor pollutants.
- **Indoor air quality.** Because all of the above health effects are a result of poor indoor air quality, it means certain groups are at increased risk. This includes infants, pregnant women, the elderly and the infirm, who are already at increased risk of illness. This is because all of these groups are likely to spend more time indoors and in the case of infants, they breathe in 50% more air per pound of body weight than adults.⁸
- **Most air purifiers** are either **HEPA** technology or **air ionizers**. Air ionizers **do not clean the air**, they **only settle dust** and **particles** all over your cabin, seats and clothes. Further data shows that HEPA Filters can Release dirty particles back into the air.

How Ecobreeze is able to reduce these environmental and human health impacts:

Due to its unique release and refiltration mechanism, Ecobreeze is specifically designed to prevent the build-up of VOCs released from the fragrance vessel. This is especially important as one of Ecobreeze's primary functions is to filter the air in spaces with little or no ventilation. This is achieved via the following means:

- **Firstly**, the extraction fan within the Ecobreeze system extracts the polluted air from the room and draws the air through an electrostatic pre-filter, capturing large particulate matter such as dust, pollen and hair.
- **Secondly**, the filtered air then passes through a 40 mm honeycomb structured, activated carbon filter. Because the activated carbon filter is so porous it is extremely effective at capturing VOCs*, and other pollutants, present within an area including those released from the fragrance vessel. The extraction fan's powerful action allows the air within a **28 m³** room to be cleaned in as little as 21 minutes.*
- **Thirdly**, the wick within the fragrance vessel is precision engineered to ensure the fragrance is released at a slow, linear rate (fragrance release is only 2 ml per 24 hours when the Ecobreeze unit is on the highest fan speed setting) therefore the amount of fragrance released into the air via the Ecobreeze system is negligible. Furthermore, due to the constant re-filtering, there is no build-up of fragrance and associated chemicals in the room as all stale fragrance is filtered out.

Overall, we have found that this makes Ecobreeze suitable for even those with very sensitive respiratory systems and that the scenting aspect is extremely tolerable even for prolonged periods of time. This is due to:

- **The minimal amount of fragrance released into the air**, (less than 2mg in 24 hours) which is favourable when compared to aerosols, for example, which release a large quantity of VOCs and propellants in a short space of time.
- The Ecobreeze system's functionality, as mentioned previously, which facilitates constant **recirculation and filtration of the air in a space**. Other systems such as aerosols, gels, fan-assisted fragrance release products, ozone generators and ionisers clog the room with potentially harmful allergens and pollutants that remain unless dispersed by adequate ventilation.
- The porous nature of the carbon filter. As well as providing effective retention of VOCs, the **sustainable coconut shell**, activated carbon filter traps a multitude of allergens and pollutants including mould, pollen and dust. Again, this provides considerable benefit for the users of spaces where Ecobreeze is installed by improving the indoor air quality. This is especially true in the case of the groups mentioned above who are likely to spend more time indoors.
- The electrostatic pre-filters are **easily washable using** a small amount of cold water or a short burst of air to remove dust and particulate matter. This means they can be reused indefinitely thus decreasing landfill waste. As a result, this ability to reuse the pre-filters reduces environmental impact across the product lifecycle as fewer need to be made.
- The carbon filters are produced from sustainable coconut shell sources. **Coconut husks are otherwise seen as a waste-product of the nut itself**, they grow in abundance from mature trees and can be harvested without detriment to the tree itself or its ability to act as a carbon sink.
- Finally, all components of the fragrance vessel (excluding the wick) are made from fully recyclable HDPE. Washroom Wizard endeavors to reuse 95% of the HDPE components.
- To negate the environmental impacts of batteries Ecobreeze is an **extra low voltage electrical appliance (12V/5W)**. The average yearly running cost is only \$2.94 and Ecobreeze is **guaranteed for 5 years, reducing the need to purchase disposable products that are costly to the environment through their production and disposal**. The Ecobreeze consumables (electrostatic pre-filter, activated carbon filter, and fragrance vessels) have all been sourced with the intention of reducing our environmental impact:
- Customers are **provided with free return, reuse prepaid carton** to safely store and return all used fragrance vessels.
- Furthermore, and again in contrast to aerosols, the wicking system **ensures complete dissipation of the fragrance contents** as there is constant air flow over the wick which allows it to dry out. Therefore, it is unlikely that the fragrance can be released into the environment in a liquid state thus **reducing environmental impact during the disposal phase**.

Other products that use similar formulations or are claiming closely related innovations to address these impacts:

Our product has been granted a patent in the EU, US, UK, Australia, Canada, China and South Africa for its innovation and we are the only company that currently offers a system into the commercial sector that both filters and fragrances. As evidence of our green credentials Ecobreeze has been funded by the EU Carbon Footprint Trust due to the product's low environmental impact and has passed approval for the LOCASE (low carbon across the South East) grant further validating our low carbon practices.

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