



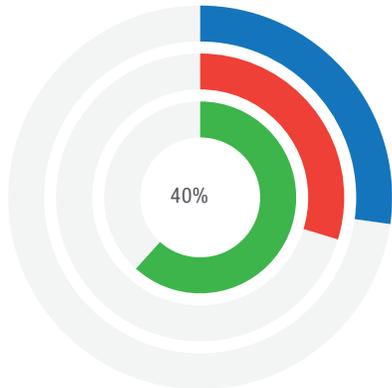
# SECOND WIND PRODUCTS EXCEL IN UNIVERSITY STUDY.

In June 2013, the University of Waterloo Faculty of Engineering, in collaboration with Second Wind Air Purifier, a division of Tiercel Technology, completed a report on the effectiveness of UV/Photocatalytic Air Cleaning Devices currently available in the marketplace. Each system was tested on the basis of effectiveness at degrading volatile organic compounds (VOCs) and disinfecting bioaerosols. This data was used to determine the disinfection efficiency of pathogens. Energy efficiency of each system was also measured and compared. Tests were carried out under controlled laboratory conditions, such that performance comparisons could be made on an equal basis.

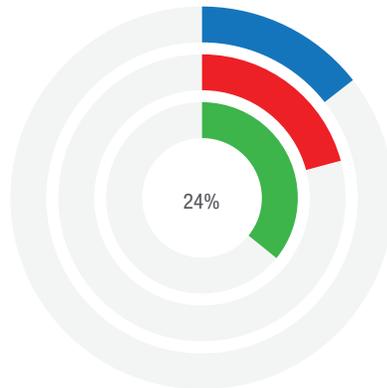
**INDUSTRY REPORT: Evaluation And Optimization Of UV/Photocatalytic Air Purification Devices**

# DESTRUCTION EFFICIENCY OF VOCs (VOLATILE ORGANIC COMPOUNDS)

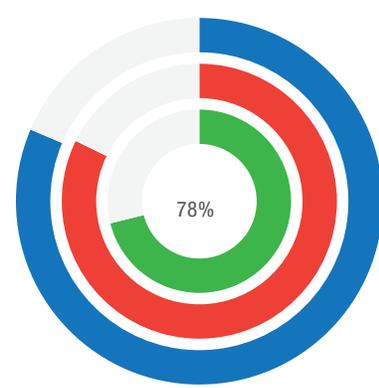
VOCs are indoor chemical pollutants that can originate from household cleaners, cooking odors, building materials, carpeting and electrical components. Toluene, propanol and limonene were used in this test because they represent three different types of organic molecules commonly found in the home. The following diagrams illustrate the destruction efficiency (%) of each system over one hour.



**Second Wind 2000**



**Second Wind 2414**

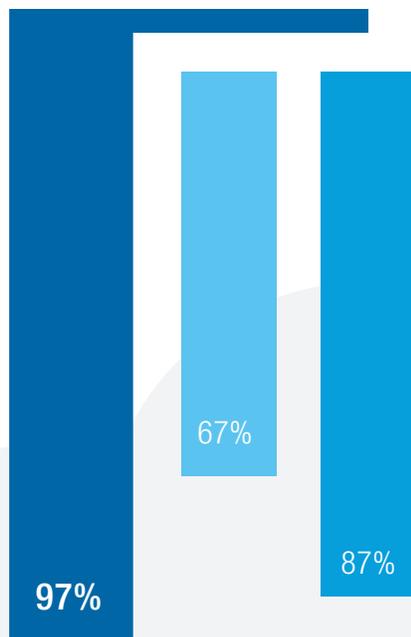


**Second Wind 2124-Z**

A highly effective odor control model that benefits from both the Singlet Oxygen System and Second Wind PCO process.

- Propanol
  - Toluene
  - Limonene
- % reflects average VOC (Propanol, Toluene, Limonene) destruction efficiency

# DISINFECTION EFFICIENCY OF BIOAEROSOLS



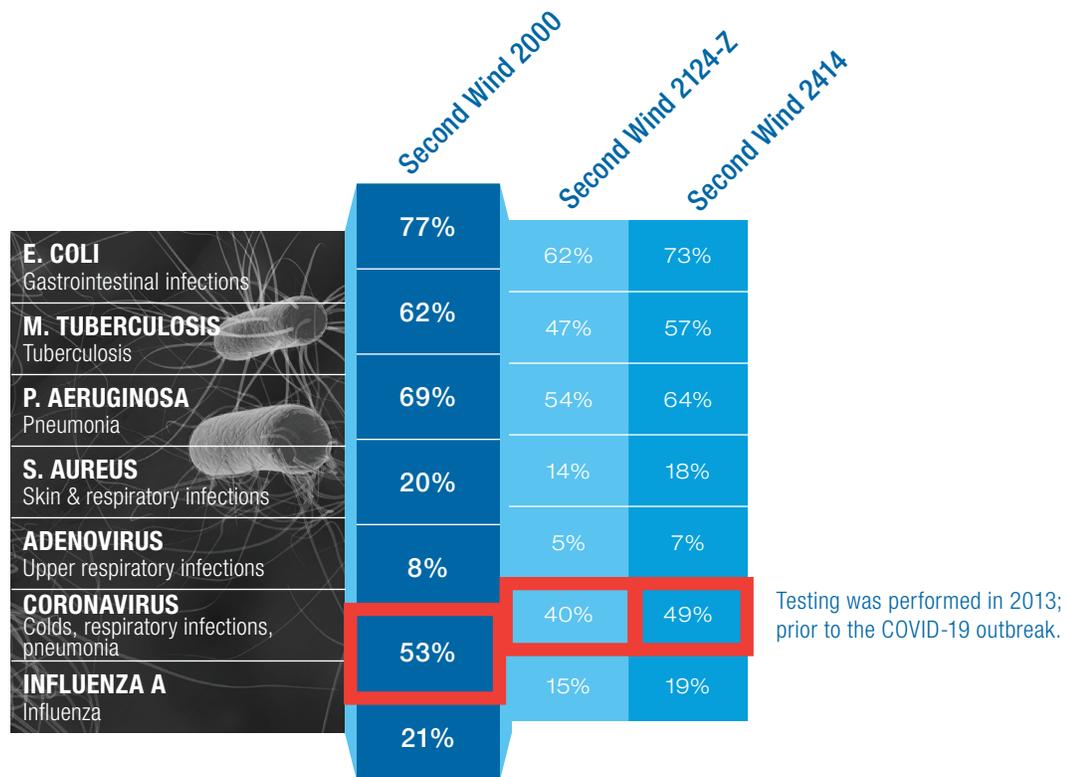
- Second Wind 2000
- Second Wind 2124-Z
- Second Wind 2414

**Second Wind 2000** › Two high output UVC lights produce the strongest germicidal field in the industry, while the PCO process breaks down odors.

Bioaerosols include molds, bacteria and viruses. These organisms present the greatest threat to our health and left untreated, they can live for days. Bioaerosol disinfection efficiency for each device was based on one hour of airflow through the duct system, illustrated above. It was concluded in the study that Second Wind's unshielded design is optimal for the purification of air moving through ductwork.

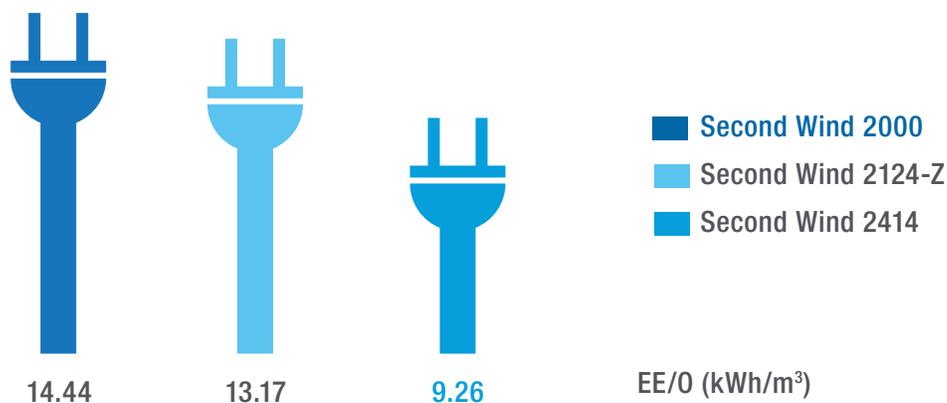
# DISINFECTION EFFICIENCY OF PATHOGENS

Bioaerosol testing was performed with yeast as a safer alternative to testing with dangerous pathogenic microbes. These results were used to determine the treatment efficiency for various pathogens using the effective UV dose required for disinfection. The performance of each system is based on a single pass through the ductwork used in the study.



# ENERGY EFFICIENCY OF AIR TREATMENT SYSTEMS

The energy efficiency of the systems tested was measured using Electrical Energy per Order (EE/O). It provides a method to normalize the comparison between each system and is the standardized measure for photochemical effectiveness.



A low value in the diagram above represents more energy efficient systems that require less energy (kWh) to reach a predetermined level of disinfection for one cubic meter (m<sup>3</sup>) of air. A higher value represents less energy efficient systems. The figures above reflect a combined average for both VOCs and bioaerosols. Second Wind models are some of the most energy efficient air treatment products available.

# ACKNOWLEDGEMENTS

Second Wind Air Purifiers gratefully acknowledges the contributions of the University of Waterloo and the Faculty of Engineering, the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Government of Canada.

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Canada

A handwritten signature in black ink, appearing to read "W. Anderson".

Professor William A. Anderson, P.Eng.  
Department of Chemical Engineering  
University of Waterloo

NSERC ENGAGE Grant: EGP 433623-12

## SECOND WIND AIR PURIFIERS

Second Wind has been recognized as a leader in ultraviolet air purification equipment for residential and commercial applications since 1990. Among our technological advancements was the introduction of dual wavelength lamp technology. Following this innovative direction came the launch of our ozone-free ultraviolet and photocatalytic air purification designs. Second Wind continues to work with independent testing facilities and university institutions to ensure the highest level of performance and reliability. Independent expert opinions of our test results indicate that we have made significant improvements in the evolution of the ultraviolet air purification technology industry.

Please contact us or visit our website to learn more about Second Wind and our air purification products.



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