

Change the
world with
the power
of water.

Welcome
to a cleaner,
healthier
world.



Orbio Technologies, a Tennant Company Group, is the leading innovator in sustainable technologies that clean, control, or kill harmful microorganisms without the use of traditional chemicals. Using the power of transformed water, the Orbio™ portfolio of water power technologies enables cleaning devices and equipment to achieve the same effect without the hazards or large environmental footprint associated with the use of traditional chemicals.

Sparked by the global success of its proprietary Orbio ec-H2O™ technology on Tennant Company's commercial floor scrubbers, Orbio Technologies' dedicated research and development teams are working to further expand the portfolio, enabling new markets and applications.

A healthier
world to live,
work, and play.

The applications for Orbio™ water power technologies are almost limitless. From Good Samaritan Hospital to Grand Erie Public Schools. From Frankfurt airport to IKEA stores. From Kroger supermarkets to your very own kitchen. Wherever traditional detergents are used to clean. Wherever toxic chemicals are used to control and kill germs. Wherever new “green” chemicals are increasingly used. There you will find Orbio™ technologies on board a variety of equipment, appliances and tools — eliminating the use of harsh chemicals.





Not just words...Proof.

Orbio Technologies' first water power offering, Orbio ec-H2O™ was introduced in 2007 on Tennant® and Nobles® floor scrubbers and has had a positive impact on the commercial cleaning industry around the world. Tested and proven to be as effective or better than chemicals in most applications, ec-H2O™ is transforming how professionals clean. Superior performance on wood, vinyl, terrazzo, ceramic tile, marble, concrete, coated floors, rubber and more — anywhere a traditional floor cleaner is used. ec-H2O™ is effective on oils and greases found in kitchens, cafeterias, produce aisles, food courts, and more.

In fact, ec-H2O™ not only proved to be a more effective cleaning method for today and the future, it also erased the sins of the past by removing old chemical residues and restoring floors to their natural luster.

ORBIO EC-H2O™ HAS BEEN ACCLAIMED BY THE INDUSTRY:

- ISSA Innovation Award
- R&D Magazine Top 100 Innovation
- Australia Business Award, Best Eco-Friendly Product
- European Business Award, Innovation Category
- Premier Healthcare Innovation
- Sustainable Industries, Top 10 Green Building Products
- Certified by NSF International for Floor Safety
- NSF International Approved for Use in Food, Beverage and Drug Processing Locations
- CE Certification for Meeting Requirements of the European Directive
- Smart Approved Watermark Certification from Australia

The Orbio ec-H2O™ application in floor scrubbers meets many conservation requirements as well, using up to 70% less water than traditional cleaning chemicals and products. Even though ec-H2O™ is green — it is NOT certified by Green Seal or Eco-Flower and for good reason. This exciting technology uses only transformed water, so there is no chemical component to certify.

With Orbio™ technologies cost goes down, productivity goes up, and customer satisfaction increases, eliminating or reducing health or accident concerns, chemical residue, and environmental impact for those living, working or playing in the places and spaces being cleaned.



WHAT CUSTOMERS ARE SAYING ABOUT ORBIO EC-H2O™

"It's very efficient, cleans very well, safe for operators, and ecological."

– Francois Morin,
IKEA Financial Manager
IKEA Rennes/France

"It gives you peace of mind to know your employees don't have to mix chemicals."

– Jackie Brown, ARAMARK,
Maintenance Supervisor

"It cleans better than any chemical method I've used."

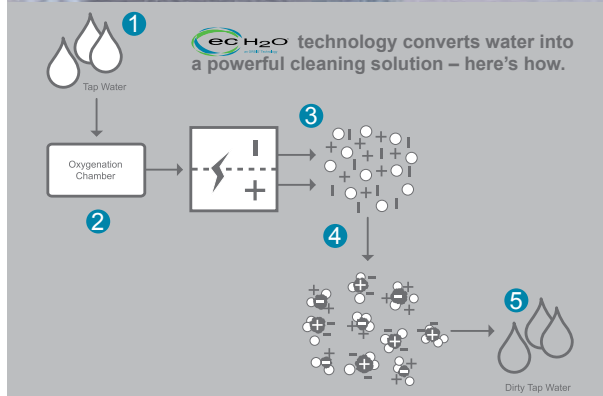
– Scott Beine, Target Center,
Operations Manager

"It's water — you can't get more green than that."

– Jay Souza, UNICCO,
Regional Operations Manager

"We clean more than 1,000,000 m² daily with ec-H2O™ technology at Frankfurt Airport. ec-H2O™ supports very well the GCS cleaning performance and productivity."

– Hans-Ulrich Schröter,
Managing Director GCS
Cleaning Service, Frankfurt Airport



Orbio ec-H2O™ technology. HOW IT WORKS

- 1 Tap water goes into a tank or holding container.
- 2 The water moves through a water pump and into an oxygenizing chamber where it's infused with oxygen to create highly oxygenated nano-bubbles.
- 3 The oxygenated water flows through a water cell where an electric current is applied. Flowing out of the water cell is a stream of positively and negatively charged water with the power of a traditional chemical cleaner.
- 4 The activated, ionized nano-bubbles are released through a sprayer, scrubber or other device to a surface for cleaning. The converted water attacks the dirt, breaks it into small particles and pulls it off the surface where it is wiped or scrubbed away.
- 5 After approximately 45 seconds the converted water recombines into normal water.

Orbio-E™ technology. Remarkable bacteria killing results – without chemicals.



What happens when the science of medicine, physics, and cleaning are combined? We invent a whole new way to kill germs without harming people, the environment or surfaces.

The future of killing harmful illness causing bacteria is here. The latest addition to the Orbio™ technology portfolio is called Orbio-E™.

This remarkable technology was co-developed with Activeion Cleaning Solutions LLC. It is being licensed by Orbio Technologies, together with the ec-H2O cleaning technology, to Activeion for use on its handheld spray devices marketed under the names ionatorEXP™ and ionatorHOM™. When used as directed, this process inactivates the H1N1 virus and kills more than 99.9% of harmful bacteria (*Escherichia coli* O157:H7, methicillin-resistant *Staphylococcus aureus* (commonly referred to as “Staph”), other strains of *E. coli* and *S. aureus*, vancomycin-resistant *Enterococci*, *Salmonella enterica*, *Pseudomonas aeruginosa*, and *Listeria monocytogenes*).

Orbio-E™ is based on a technology called electroporation, which has long been an effective and important tool in molecular and cellular biology for

medical and pharmaceutical research. Electroporation uses a low-level, externally-applied electrical field to temporarily disrupt cell membranes, allowing small molecules (such as DNA) to pass directly into the cells. If the applied electric field is below a certain threshold, the disrupted areas — i.e. the pores formed in the cell membrane — simply heal after the electric field is turned off, allowing the modified cells to survive.

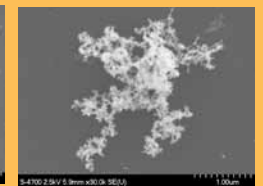
Orbio-E™ technology causes irreversible electroporation that goes beyond the effects of typical, temporary cell electroporation. Orbio-E™ is a novel, non-chemical mechanism of killing. When used as directed on hard surfaces, it disrupts and kills bacterial cells which may cause harmful infections. Quantitative laboratory tests also show that Orbio-E™ inactivates important pathogenic viruses like H1N1 influenza.

Orbio-E™ uses only water and very small amounts of electrical energy to deliver impressive antimicrobial performance. Additional important benefits of this breakthrough technology include improved sustainability, a reduced environmental footprint, as well as reduced hazards from the potential misuse of chemical products.

Orbio Technologies Group is conducting detailed studies to optimize this promising technology. One recent study investigated Orbio-E™ effects on bacteria using a Scanning Electron Microscope (SEM). The images below show *E. coli* and *S. aureus* bacteria before applying and after applying Orbio-E™ technology in a 2-second spray. Bacteria cell walls are clearly compromised when treated with Orbio-E™.



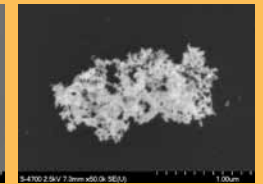
E. coli – No Spray



E. coli –
After 2 Second Spray



S. aureus – No Spray



S. aureus –
After 2 Second Spray

NOTE: These electron micrographs were obtained by the Characterization Facility at the University of Minnesota

Despite its harm to bacteria, Activeion™ has tested the impact of the technology in an independent laboratory and determined that it has no measurable detriment on skin or eyes, when ingested or inhaled. Therefore, the Activeion products do not carry any chemical-related warning label.



Orbio ec-H2O™ Leave no trace.

Cleaning using Orbio™ technologies improves the quality of life for people and the planet. These technologies are safe for people and the environment and yet remarkably effective.

Orbio™ technologies significantly reduces issues related to air quality, inhalation, eye and skin irritations, slip-fall injuries, and many other health and safety concerns. With so little impact on people, Orbio ec-H2O™ and the Orbio-E™ technology do not even require an EPA chemical-related health warning label.

Orbio™ technologies are also planet-friendly because they eliminate the packaging, shipping, disposal and contamination issues associated with traditional and even new “green” chemicals.

The independent environmental sustainability group EcoForm conducted a life cycle assessment that showed ec-H2O™ technology significantly reduces environmental footprints across seven key categories when compared to traditional cleaning with chemicals.

Orbio ec-H2O™
reduces
impact from
traditional
chemical
cleaning by
77% to 98%

Smog ↓ 98%

Energy ↓ 97%

Global Warming ↓ 96%

Acid Rain ↓ 94%

Air Pollution ↓ 94%

Ozone Depletion ↓ 94%

Water Pollution ↓ 77%

(used daily)







Orbio Technologies. More than 30 patents and counting.

By transforming simple tap water into a superior cleaning agent, Orbio Technologies has redefined what socially responsible, healthy, human-friendly cleaning means. With two proprietary technology platforms and more than 30 patents pending, Orbio™ is defining new methods of sustainable cleaning as well as controlling and killing harmful microorganisms.

Working with a highly-esteemed network of scientists, regulatory advisors, public and private institutions, global testing laboratories, and leading universities, Orbio™ continues to expand the capabilities of its water power technologies.



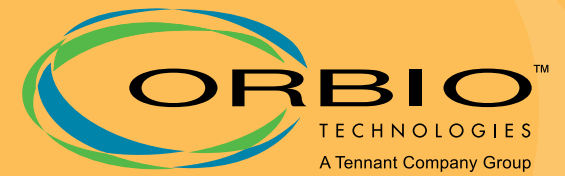
Partnering to create a healthier world.



The opportunities for use of Orbio™ technologies are far reaching. As the capabilities of the technology portfolio expand from cleaning to controlling and killing harmful microorganisms, the number of potential applications are many.

Think about all of the places where chemicals are used today and imagine achieving the same effect without using traditional packaged chemicals! In the future, applications could range from dishwashers to car washes, schools to hospitals, even food processing or manufacturing.

Orbio Technologies is open to exploring partnerships with innovative companies who are interested in applying their remarkable technologies to new markets and applications.



For information on partnership opportunities, development of new product applications or innovating using Orbio™ technologies:

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