

## ConsERV™ Ventilation for Battery Charging Spaces

### Executive Summary

The ConsERV™ advanced fixed-plate Energy Recovery Ventilator (ERV) stands as a market leader in enhancing building ventilation efficiency globally. Central to its innovation is Aqualyte™, an advanced nonporous nanomaterial that prevents the crossover of pollutants into ventilation air while maximizing transfer of humidity. This unique material ensures improved air quality with significant energy savings, offering a payback within two years or less.

Modern warehouses rely heavily on electric vehicle batteries which release hydrogen during charging — a potential safety hazard. Many buildings mitigate this concern with ventilation, but energy recovery is commonly omitted to ensure hydrogen cannot return to the building. ConsERV™ is exceptionally effective in managing hydrogen emissions, as Aqualyte™ prevents hydrogen molecules from passing between airstreams. Incorporating ConsERV™ into the ventilation system saves up to 80% of the ventilation energy expended by non-ERV systems while ensuring a safe, hydrogen-free charging environment that enhances workplace safety.

The benefits of ConsERV in warehouses extend beyond safety:

- ConsERV™ system effectively exhausts harmful microbes and chemicals, maintaining a healthier internal environment. This leads to reduced absenteeism and improves cognitive performance among workers.
- Independent tests highlight ConsERV™ superior efficiency, with nominal total effectiveness of 68%, and potential to reach over 80%. This translates to significant energy savings — approximately 30 - 40% annually on HVAC systems — often resulting in a payback period of 2 years or less.
- ConsERV™ significantly reduces carbon footprint. For every 1000 CFM of ventilation, it avoids around 28 metric tons/year of CO<sub>2</sub> emissions, underscoring its role in sustainable business practices.

ConsERV™ stands out as a comprehensive solution for modern warehouses, addressing both challenges of safety and sustainability. It conserves energy and reduces operational costs while creating a healthier and more productive work environment.

### Background

Warehouses are an expanding sector of the modern economy, providing important services to many industries with the storage and distribution of goods and they rely on electric vehicles such as forklifts for many internal operations. These batteries necessitate the use of charging stations, and sealed lead acid (SLA) and open lead-acid batteries release hydrogen

during the charging process. The hydrogen is combustible and poses a safety risk if not properly managed. Current ventilation methods maintain safety but are extremely energy inefficient. Advanced ConsERV™ energy recovery ventilation systems will greatly enhance this efficiency.

ConsERV™ advanced fixed-plate Energy Recovery Ventilator (ERV) is the market leader in ventilation, vastly improving the efficiency of buildings across the world. At the heart of every ConsERV™ system is the Aqualyte™ nanomaterial, a nonporous barrier between the two air streams that does a superior job of preventing crossover of pollutants, odors, and contaminants into the ventilation air. The uniquely engineered chemical properties of Aqualyte™ allow only pure water molecules to pass through, leaving the unselected molecules to be exhausted out of the building while improving the supply air temperature and humidity. The Aqualyte™ advantage makes ConsERV™ the best choice for most building applications.

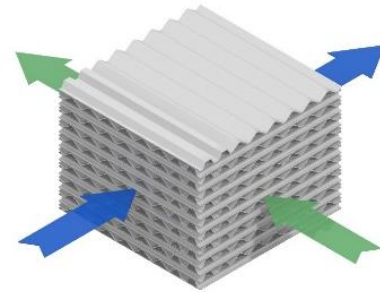


Figure 1: ConsERV Energy Recovery Core

## Application of ConsERV™ Systems in Charging Environments

A ConsERV™ system provides a safe, reliable, and healthy way to exhaust air rich in hydrogen molecules without concern that it will be reintroduced through the energy recovery process. Unlike other technologies that are leaky and porous (especially since hydrogen is a very small molecule), the pioneering engineering of Aqualyte™ keeps hydrogen molecules from passing between the air streams, effectively guaranteeing the thorough expulsion of the hydrogen to maintain a low concentration of hydrogen in the charging environment.

The multilayered safety benefits of ConsERV™ make it an ideal and comprehensive solution for fortifying the safety of warehouse workers. While keeping the levels of hydrogen in the charging space low, ConsERV™ exhausts many other types of potentially hazardous microbes and chemicals without contaminating the incoming ventilation air. Rigorous independent testing also shows no fungal or bacterial growth occurs on the Aqualyte™ material and greater than 99.9% of viruses are deactivated within five minutes of exposure<sup>i</sup>. This helps maintain a healthier internal environment to maximize occupant health and productivity, as studies show better ventilation results in lower absenteeism and higher cognitive performance.

Installing ConsERV™ into a battery charging warehouse space yields cost savings and substantially reduces energy consumption, offering financial advantages. Independent testing proves ConsERV™ has the highest total efficiency in its class with a nominal total effectiveness of 68%<sup>ii</sup> and systems can be designed to achieve over 80% total effectiveness. In a typical building, that yields approximately 30 - 40% annual energy savings on the HVAC system. The reduction in energy consumption often delivers a payback in 2 years or less on investment<sup>iii</sup>.

Additionally, ConsERV™ plays a pivotal role in minimizing a building's carbon footprint. For every 1000 CFM of ventilation, the energy savings from using ConsERV™ avoids approximately 28 metric tons/year of carbon dioxide emissions at the power plant. ConsERV™ provides warehouses with the benefit of providing a world class ventilation system that saves energy, ultimately reduces operational cost that provides a healthy financial return on investment and the environment.

Aqualyte nanotechnology in ConsERV™ provides both comprehensive hydrogen removal

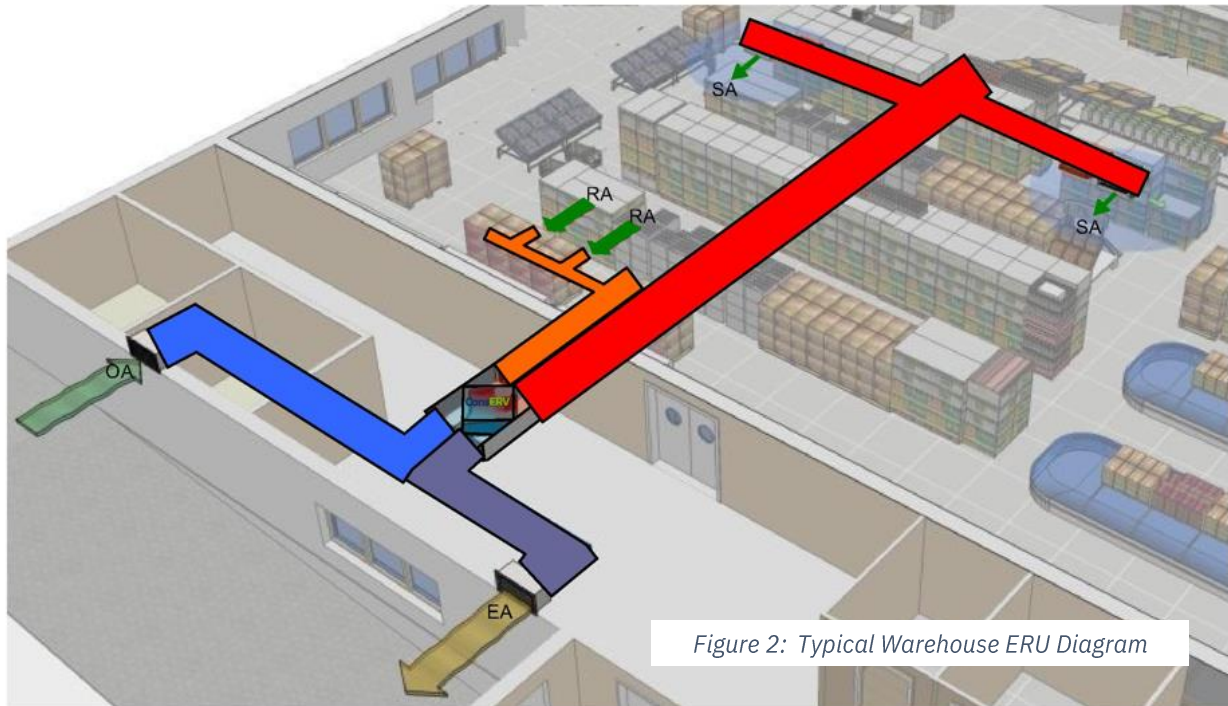


Figure 2: Typical Warehouse ERU Diagram

and energy recovery. Modern warehouses have a large role in the economy and ConsERV™ enhances their sustainability by reducing energy resource usage. Its impact stretches beyond immediate financial gains, as companies can improve worker safety, productivity and reduce the spread of illness with ConsERV™. As industries navigate forward, ConsERV™ remains a reliable partner, assisting businesses with elevating standards while contributing to a greener future.

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<sup>i</sup> Third party independent ASTM tested, available on request

<sup>ii</sup> AHRI-certified performance

<sup>iii</sup> Calculation based on energy savings and energy cost of 12 cents per kWh