



## The Advantages of the ART Aquaculture System Compared to Other RAS Technologies

In the global push for sustainable aquaculture solutions, Recirculating Aquaculture Systems (RAS) have gained significant traction due to their ability to meet environmental and economic challenges.

Among these, the **ART (Aqua-Ring Technology)** system stands out for its innovative approach, offering advantages that address some of the most pressing issues in the aquaculture industry.

### Cost Efficiency

ART is notably more affordable than competing RAS technologies, especially those from Western manufacturers. The modular design of ART allows for scalability based on project needs, minimizing initial capital investment. Additionally, its operational cost is significantly lower due to energy-efficient systems and reduced reliance on chemicals, making it an attractive option for small-scale and industrial-level aquaculture projects.

### Modular and Autonomous Units

A key feature of ART is its **independently functioning units**, which add flexibility to project size and operation. This modularity ensures that aquaculture operators can scale up or down without compromising efficiency or performance, a feature not available in traditional RAS systems which are characterized by a central filter for all tanks, with almost no possibility of modular and consistent expansion of the project.

### Energy Savings

ART systems incorporate **advanced energy-saving technologies**, leading to a dramatic reduction in energy consumption compared to traditional RAS setups. This feature is particularly crucial in regions where energy costs are high, or sustainability goals are prioritized.

### Biosecurity and Risk Mitigation

The ART system's design emphasizes **biosecurity**, reducing the risks of disease spread within aquaculture operations. The containment and self-reliant nature of its units also enhance the ability to isolate and address issues without affecting the entire system, thus minimizing operational risks.

### Environmental Responsibility

ART takes sustainability to the next level by:

- **Eliminating wastewater and sludge discharge:** Unlike many RAS systems, ART retains and recycles all waste products within the system, preventing pollution and ensuring compliance with stringent environmental regulations.
- **Water conservation:** The system achieves a phenomenal reduction in water usage, which is especially critical when dealing with seawater or brackish water. This efficiency not only saves resources but also reduces costs tied to water treatment and procurement. More than that, ART doesn't need seawater to operate with marine fishes, so this land-based solution can be applicable anywhere and far from the ocean.

### Enhanced ROI



[info@YEDTrade.com](mailto:info@YEDTrade.com)



+972-54-4202204 / +972-52-920094 / +972-52-9210056



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With lower initial costs, reduced operational expenses, and increased efficiency, the return on investment (ROI) for ART systems surpasses that of other RAS technologies. The high profitability margin makes it a favored choice for investors and operators seeking sustainable aquaculture solutions.

### **Sustainability and Global Trends**

As the world moves towards sustainable food production systems, ART aligns with the global trends in aquaculture that emphasize environmentally friendly practices, cost savings, and efficiency. By addressing water scarcity, pollution, and energy concerns, ART positions itself as a forward-thinking solution for the growing demand for marine protein.

### **Comparison with Other RAS Technologies**

When compared to traditional RAS:

- **Comprehensive Design:** The Aqua-Ring system is uniquely designed so that each unit (tank) functions as a fully self-contained RAS (Recirculating Aquaculture System). Each unit includes an integrated water treatment system capable of managing and eliminating waste products such as sludge, ammonia, nitrite, and nitrate. This is achieved through an innovative arrangement of filters, which ensures efficient water treatment with minimal external intervention.
- **Cost Efficiency:** The smallest Aqua-Ring system has a total capacity of 9 cubic meters (Except for special requests for smaller units), which includes the filtration components. Of this, 5 cubic meters are net capacity dedicated to fish cultivation. The cost for one unit of this basic system is approximately \$6,150 (FOB), and approximately \$7180 for the advanced system Aqua-Ring +.
- **Efficiency:** The independent operational units of ART outperform the centralized approach of most RAS systems in terms of energy use and biosecurity.
- **Environmental Impact:** ART's closed-loop design minimizes ecological footprints, unlike many RAS systems that still discharge treated water and sludge into the environment.

### **In addition:**

Comparisons of RAS systems typically focus on fattening operations and involve two standard benchmarks: establishment cost per system size (measured in cubic meters) and establishment cost per annual production volume (measured in tons). However, these benchmarks are most relevant for projects involving grow-out systems.

Currently, the focus of ART is on breeding, hatchery and nursery systems, where comparisons align more closely with open breeding and nursery facilities.

These conventional systems rely heavily on drawing water from natural sources like seas, rivers, or lakes, or creating brackish water (e.g., for freshwater prawn's larvae culture). Such setups often necessitate endless logistics for transporting seawater in tankers and blending it with fresh water, leading to significant resource and operational challenges.



[info@YEDTrade.com](mailto:info@YEDTrade.com)



+972-54-4202204 / +972-52-920094 / +972-52-9210056



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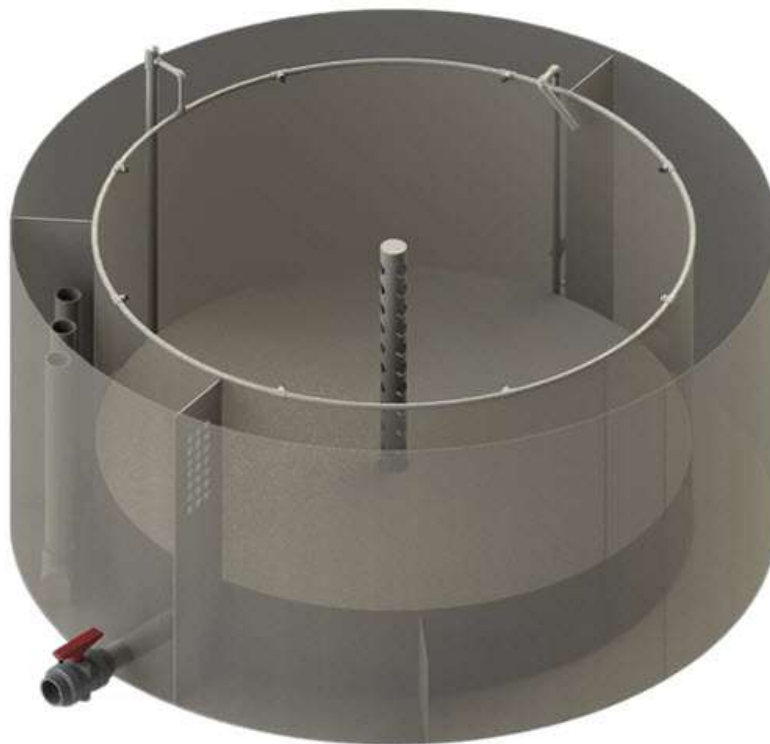


ART systems, in contrast, offer a closed-loop, environmentally friendly alternative with reduced water usage, energy savings, and logistical simplifications, making them highly competitive in this context.

### **Collaboration for Success**

The most effective way to introduce ART systems into new markets is through partnerships with local industry players. Collaborating with stakeholders who understand regional aquaculture needs and challenges ensures smoother integration and maximizes the system's impact.

In conclusion, ART's innovative approach provides a cost-effective, efficient, and sustainable alternative to traditional RAS systems, making it an ideal solution for the aquaculture industry's future needs. As demand for high-quality marine protein grows, ART is poised to play a pivotal role in transforming aquaculture globally.



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