

RAS2020™

Advanced Recirculating Aquaculture System

Fish Farming of the Future

WATER TECHNOLOGIES

Fish Farming of the Future is Here

The future is now.

Introducing **Veolia’s patented RAS2020™**, a modular recirculating aquaculture system designed to reduce capital costs, maximize production, minimize operating costs, and improve sustainability.



The Opportunity for Land-Based Aquaculture

The demand for quality seafood and sophisticated consumer purchasing trends have increased. This combined with the environmental and financial risks of off-shore aquaculture create the need for farmers to gain greater control over their operations. Land-based RAS (Recirculating Aquaculture Systems) is a solution for aquaculture companies to reduce risk, while maximizing profitability.

Farm-to-Table Fresh

Geographic challenges make it difficult and expensive for some regions to receive fresh seafood. The RAS2020 allows farmers to achieve a farm-to-table strategy by locating facilities on land near key markets. This reduces shipping costs and shortens delivery timeframes, while offering consumers a superior fresh product.

Biosecurity

The biosecurity of the RAS2020 is based on full control of the incoming potential risks. The system includes comprehensive treatment of the incoming water (filtration, ozone, UV), a biosecure gate for personnel entering the facility (to change clothing and footwear), and full-control and separation between biosecure and non-secure areas.

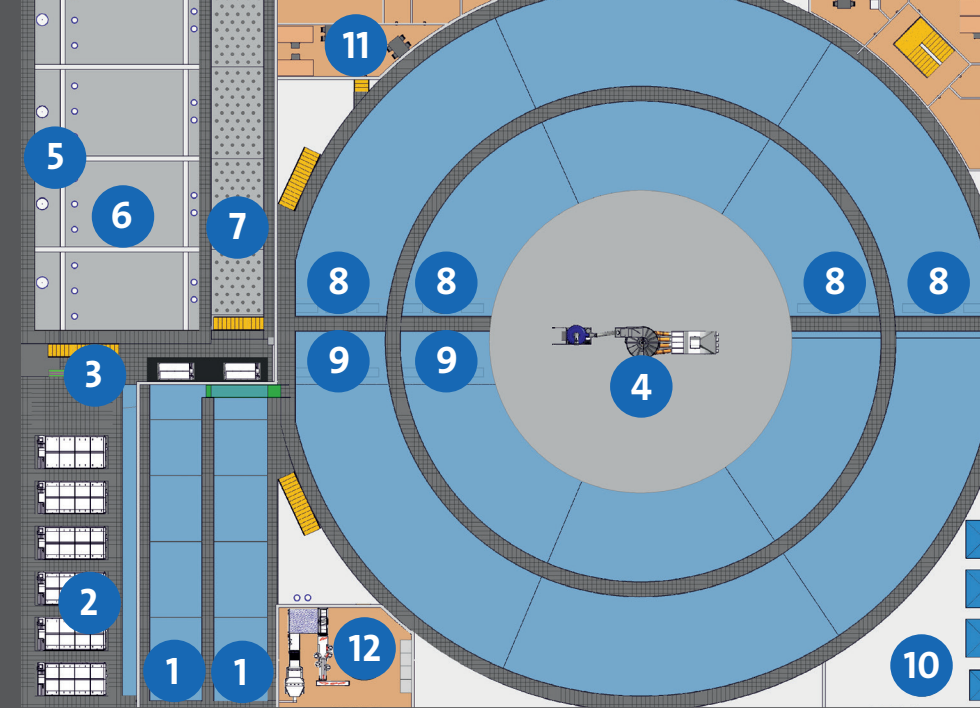
Key RAS2020™ Benefits

- 99.5% of the water is treated and recirculated
- Up to 50% reduced footprint
- Highly-controlled and uniform flow velocity to mimic a natural aquatic environment
- Efficient facility design that ensures biosecurity
- Reduced operating and utility costs
- Reduced handling to minimize fish stress
- Proven water treatment processes
- Optimized feed conversion ratio

RAS2020 System Design

Revolutionizing Aquaculture

1. Purge Tanks
2. Hydtrotech Drum Filters
3. UV Filter
4. AnoxKaldnes™ MBBR, Fish pump, Grader and Counter
5. Axial Flow Pumps
6. CO₂ Degasser
7. Medium Head Oxygenation Units
8. Inlet of treated water to Fish Tank
9. Outlet from Fish Tank to Water Treatment System and Flow Makers
10. Feeding System
11. Control Room
12. Processing



Cost-Efficient Design

Controlled Aquacultural Environment

The RAS2020™ has a number of advantages compared to conventional RAS solutions

Optimal aquatic environment for fish health and improved product quality

- Adjustable tank sections create optimal fish density with moveable screens within the tanks
- Highly-controlled and uniform flow velocity of the water within the entire system
- Easy and low-stress transfer of fish to purge tank and to processing using moveable grids
- Separation of fish in two purge tanks (per module)

Operational Efficiency

- Reduced energy costs
- Lower manpower needs
- Excellent conditions for management and safety
- Sorting and grading equipment may be placed on the central platform, reducing distances during the fish handling process
- Harvest can be efficiently performed by the staff, without disturbing or starving the main fish population
- Optional protein skimmer with ozone injection in RAS loop

Advantages during construction

- Reduced building footprint (only 36,000 ft² / 3,340 m² per module)
- Reduced costs of construction materials
- No underground piping to reduce construction risks and bio-growth
- Expedited construction and start-up
- Lower land impact – up to 50% less



The RAS2020 mimics the flow of a natural stream, which helps to increase fish health

Superior Aquatic Environment

The RAS2020 creates a highly-controlled environment that supports healthy fish growth.

The proprietary circular raceway and flow control system creates a uniform hydraulic velocity that can be adjusted in the inner and outer tank sections. This allows the fish to naturally swim within the tank area. The flow combined with the system’s superior water quality helps reduce fish stress, improve growth, and ensure a quality final product.

Water Quality Performance Guarantee

The RAS2020 is delivered with a performance guarantee of specified threshold levels of key water parameters to secure optimal fish welfare at maximum production.



Accommodates Various Fish Species

The RAS2020 is well suited for species such as salmon, trout, kingfish, sea bass, pike perch, among others.

FEATURED SUSTAINABLE AQUACULTURE PROJECT

Sashimi Royal in Denmark has received the certification from Aquaculture Stewardship Council (ASC) as a sustainable and quality seafood producer.



Watch an interview with
Claus Rom, CEO of Sashimi Royal
www.veoliawatertech.com/aquaculture

SELECTED REFERENCES OF LAND-BASED RAS2020™ FISH FARMS

- Salmon – Swiss Alpine Fish, Switzerland
- Kingfish – Sashimi Royal, Denmark
- Salmon – Fredrikstad Seafoods, Norway



Resourcing the world

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