

Water Technologies & Solutions

# innovative solutions for recirculating aquaculture systems (RAS)



ready for the resource revolution



A growing number of consumers around the world want great tasting fish that is farmed sustainably, is healthy, local, and traceable. To meet the growing demand and achieve long-term sustainable growth, the RAS industry must strive for faster growth rates, increased productivity, and lower FCRs while requiring less water and discharging waste effluents safely and in compliance with regulations.



### makeup water treatment

Solutions that provide high-quality, bio-secure makeup water from multiple sources by meeting a wide variety of treatment needs from suspended solids removal, pathogen and H<sub>2</sub>S removal, softening and desalination, and salinity adjustment.

### bio-secure side-stream treatment

Increase productivity and lower makeup water volumes by removing nitrates, suspended and colloidal solids, bacteria, viruses, and geosmin/MIB from a small portion of the RAS flow (<10 system volume turnovers per day).

### wastewater treatment and reuse

Solutions to meet the most stringent effluent discharge requirements and produce a high-quality reuse stream to reduce the overall intake water rate.

## biological treatment



### membrane bioreactor - LEAPmbr\*

Biological treatment integrated with membrane filtration using SUEZ's industry leading ZeeWeed\* ultrafiltration membrane.

**treatment goals** – nitrogen, suspended and colloidal particles, particulate and dissolved organics, bacteria, and pathogen removal

**RAS application** – effluent waste treatment and reuse



### MBBR and IFAS – METEOR\*

Simple and efficient fixed-film biological process utilizing the METEOR biofilm carrier technology.

**treatment goals** – nitrogen (ammonia and nitrate), and organics removal

**RAS application** – recirculation ammonia removal, side-loop denitrification, effluent waste treatment

## filtration



### media filtration – FiltraFast\*

High-rate media filter technology utilizing compressible synthetic media. Achieves superior filtration performance at up to 75% less surface area and footprint compared with conventional media filters..

**treatment goals** – suspended solids

**RAS application** – makeup water filtration



### membrane ultra-filtration

Pre-engineered or custom ultrafiltration systems for treatment of fresh water, brackish water, and sea water utilizing the ZeeWeed\* 1500 membrane.

**treatment goals** – suspended and colloidal solids, bacteria, and pathogen removal

**RAS application** – makeup water filtration, and side-loop treatment

## clarification



### high-rate clarifiers – densadeg\* and densadeg XRC\*

Superior solids removal performance with a significantly reduced footprint using high-rate and ballasted media clarifier designs.

**treatment goals** – suspended solids, organics, and metals and phosphorous removal with chemical addition

**RAS application** – effluent waste treatment and solids thickening



### dissolved air flotation (DAF) - Poseidon\*

Horizontal (PPM\* series) and vertical (Saturn\* series) dissolved air and nitrogen flotation systems for wastewater treatment.

**treatment goals** – suspended solids, organics, and phosphorous removal with chemical addition

**RAS application** – effluent waste treatment

## purification and disinfection



### ozone generation – ozonia\*

Ozone oxidation treatment with ozonia's advanced ozone generation systems with the patented IGS technology.

**treatment goals** – organics, colour, bacteria, pathogens, geosmin, and MIB removal

**RAS application** – makeup water, side-loop, effluent waste reuse



### UV disinfection – aquaray\*

Ultraviolet disinfection systems in closed pipe and open channel configurations.

**treatment goals** – bacteria and pathogen removal

**RAS application** – makeup water disinfection, effluent waste reuse, side-loop

## membrane desalination and softening



### fresh water and brackish water RO, NF

Pre-engineered or custom nanofiltration and reverse osmosis systems (PROflex\*, SEAPRO\*) to soften and desalinate fresh, brackish, and sea water.

**RO removal** – hardness (Ca+, Mg2+), TDS (sulfates, chlorides) - desalination

**NF removal** – hardness (Ca+, Mg2+), some sulfates – softening

**RAS application** – makeup water treatment



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