



AQUATIC ECO-SYSTEMS

SEA PEN

AERATION SOLUTIONS

DESIGN, SOLUTIONS AND EQUIPMENT EXPERTISE

DON'T STRESS AERATE

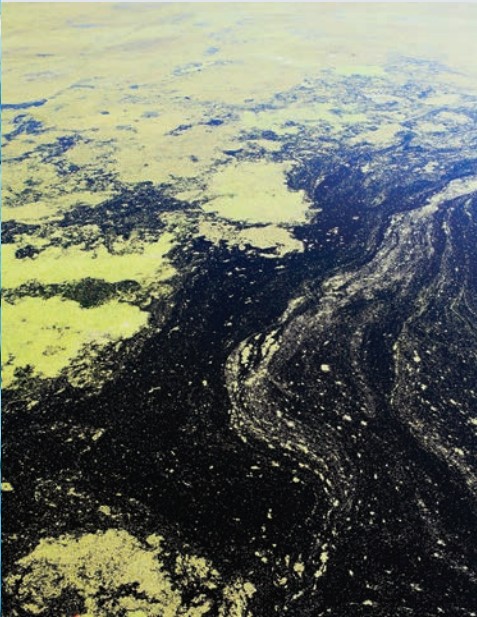
HARMFUL ALGAL BLOOMS (HAB). LOW DISSOLVED OXYGEN (DO) EVENTS. PARASITE INFESTATIONS.

Any one of these can wreak havoc on your net-pen operations. In fact, year after year, millions of dollars are lost to these events.

WHAT THE FISH FARMER NEEDS IS A PROVEN WAY TO MITIGATE THE IMPACT OF THESE EVENTS.



AQUATIC ECO-SYSTEMS



INNOVATIVE SOLUTIONS FOR EVERY BODY OF WATER

With 35 years of aquaculture leadership, Pentair Aquatic Eco-Systems has the knowledge and experience to help your sea pen operations succeed. Because while the world's need for farm-raised fish has grown, so too has the need for a proven partner to help the world's fish farmers. From concept design through harvest, we're with you every step of the way—no matter the size of your business or species produced.

WATER QUALITY EXPERIENCE THAT RUNS DEEP.

Mounting costs

Harmful algal blooms (HAB) have an estimated economic impact of **\$82 million** annually.

Factor in the cost of low dissolved oxygen (DO) events, especially to larger fish, and the need to address these events is clear.

Source: oceanservice.noaa.gov/hazards/hab

30,000

EMPLOYEES

SIX

CONTINENTS

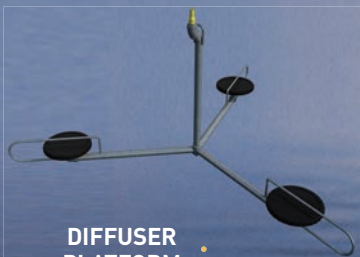
100+

MANUFACTURING FACILITIES

90+

SERVICE CENTERS

INTRODUCING PENTAIR SEA PEN AERATION SYSTEMS (SPA)



DIFFUSER
PLATFORM

POINT FOUR
RIU3

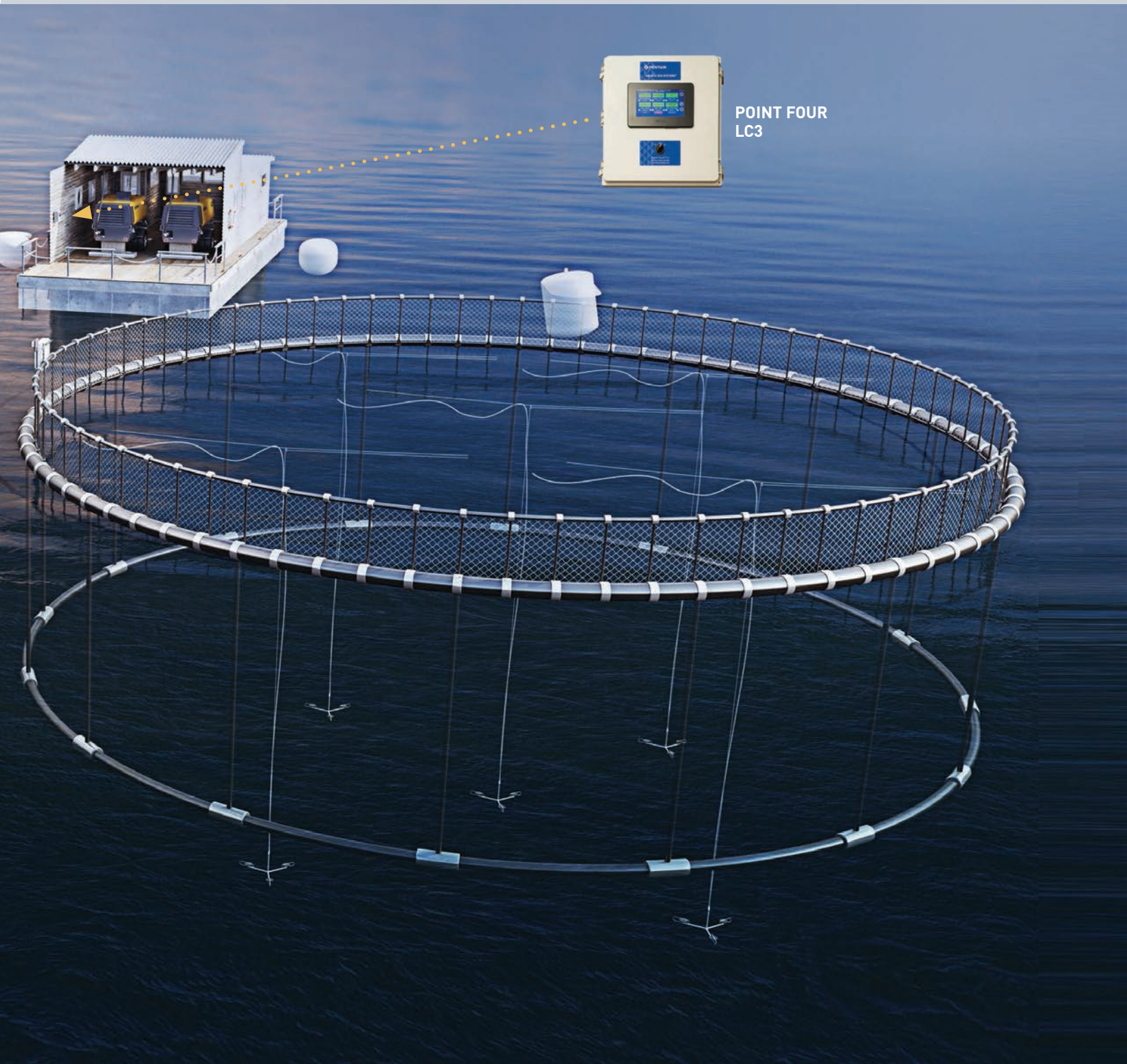


FLOW-METER
ASSEMBLIES



THE UNIQUE POD-BASED APPROACH PROVIDES DELIVERY SYSTEMS THAT CAN BE CUSTOMIZED TO THE REQUIREMENTS OF EACH SITE.

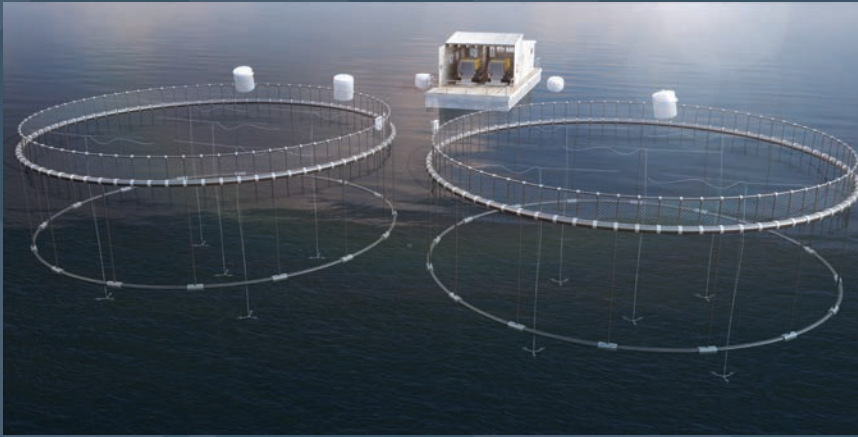
Each pod can be placed strategically throughout the pen at specific depths to compensate for conditions and optimize dissolution. The diffused air has a better chance of reaching the fish stock. Reduced fish mortality rates and stress levels improve overall yields. Coupled with controlling and monitoring equipment, the Pentair Sea Pen Aeration System offers a management solution unlike any other.



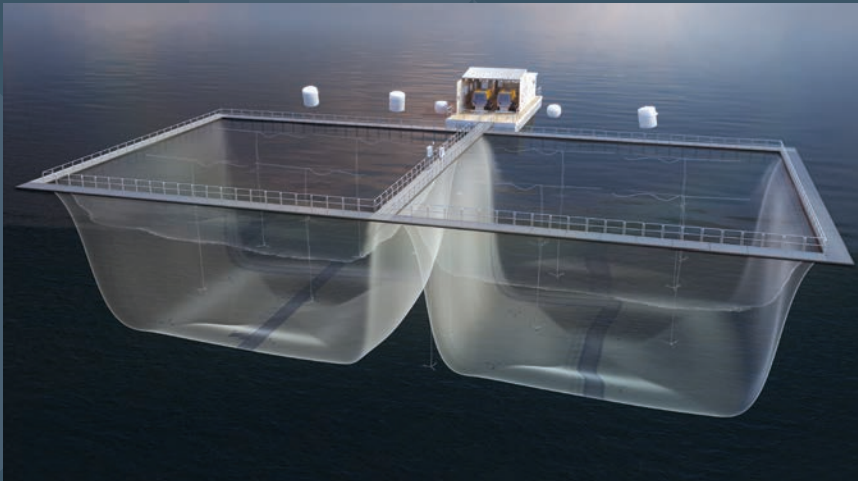
POINT FOUR
LC3

SYSTEM CONFIGURATIONS

ROUND PEN LAYOUT



SQUARE PEN LAYOUT



DIFFUSER PLATFORM



Features and Benefits

- Lightweight for easy installation and removal
- Designed not to snag or tear nets
- Removable membrane disc diffusers make for easy maintenance or replacement

AERATION PLATFORM

Material of Construction	Powder Coated Steel
Diameter	6.5 ft/2 m
Diffuser Size A	3 x 9" or 12"/76 x 229 mm or 305 mm rubber membrane disc diffusers
Design Airflow- 9"	0-10 scfm/0-283 lpm
Design Airflow- 12"	0-18 scfm/0-510 lpm
Height (Hanging) B	4 ft/1.2 m
Weight	41 lbs/18.60 kg



COMPRESSOR OVERVIEW

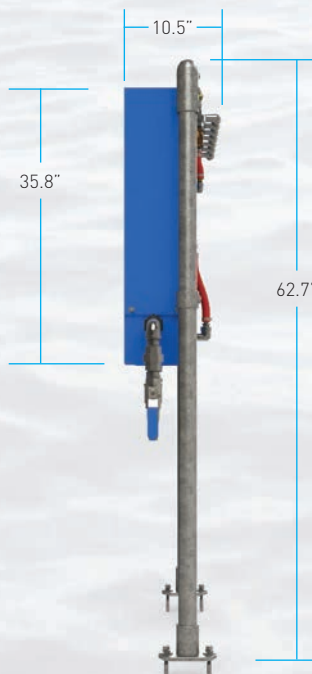
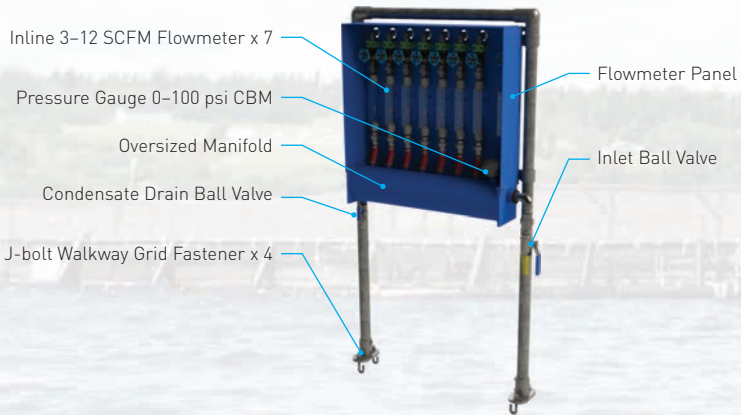
Pentair is able to recommend compressors ideal for your application, equipped with options for your specific needs:

- Food Grade oil available, for environmentally sensitive areas
- Spill containment available as option
- Lightweight, but powerful package
- Tier 3 exhausts emission compliance
- Reliable engine capable of operating under widely varying climatic conditions, large capacity oil cooling system, high efficiency heavy-duty two-stage intake filters (with cartridge replacement indicators)
- Highly efficient oil extraction system for low oil consumption
- Large capacity fuel tank
- Gull wing doors for easy access to engine and components
- Rugged and reliable, needing little maintenance

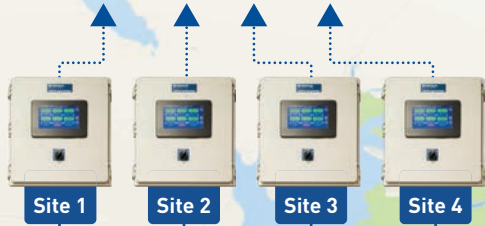
AERATION PANEL OVERVIEW

FLOWMETERS

Accuracy	±3% F.S.
Pressure	100 PSIG/6.9 Bar Minimum
Flow Rate	3-12 SCFH
Configurations	4 thru 7 Manifolds
Mounting Options	Round or Square Pen



NEXT GENERATION POINT FOUR MONITORING AND CONTROL



ENVAULT CLOUD MONITORING PLATFORM

Features and Benefits

- View multiple connected devices from various locations (worldwide)
- EnVault works on all smart phones and computing devices with no software to install and page reloads
- Receive system notifications & alerts via Email/Text message
- Customizable dashboards for viewing and reporting data



Point Four EnVault Web Interface



POINT FOUR™ LC3 WATER MONITOR/CONTROLLER

Key Features

- Remote access compatible with a wide range of devices (Android™ platform, iOS™ mobile digital device, OS X®, Linux and Windows® Operating Systems)
- Built-in web server allows control system access thru the internet via web browsers
- Automated data logging for all connected Point Four RIU3 controllers, control devices and sensors
- Auto dialer and digital alarm outputs
- Send email and email to SMS functions (Short Message Service)
- FTP (File Transfer Protocol) capability allows users to upload logged system data to an external site (such as Point Four EnVault) for data reporting and analysis.



POINT FOUR™ RIU3 REMOTE WATER MONITOR/CONTROLLER

Key Features

- Accepts multiple input types (4-20mA/0-5 V/Modbus RS485)
- Contains 2 SPDT 4 amp relays which can be setup to provide localized alarm indication for both Oxygen and Temperature values.
- Field probe calibration, which is easily performed using the weatherproof 4 button keypad

REDUCE MORTALITY RATES AND STRESS LEVELS TODAY





Promote greater water upwelling and movement across all your pens

Even distribution of compressed air throughout a sea pen site moves low density algae/plankton water from below to dilute the algae/plankton density in the water inhabited by the fish within the pens to a reduced level.



PLANKTON MITIGATION

Problem

There are different strains of algae/plankton that pose different threat levels to the well-being of the fish.

The Pentair Approach

Position, depth and air flow to each diffuser platform can be controlled independently. This allows site operators to mitigate different harmful plankton species, for each pen, based on the plankton's unique motility.

CASE STUDY

To combat issues such as HAB and low DO events in their sea pens off British Columbia's coast, Marine Harvest Canada counts on the PAES Sea Pen Aeration System to deliver a robust water-quality management platform.



Marine Harvest ASA has operations in 22 countries. With over 10,000 employees and more than 50 years in aquaculture, Marine Harvest is the world's largest producer of Atlantic salmon.



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