Your Aquaculture Technology and Service Partner
Budgeting means planning years ahead to create an image of the size and shape of your operations. This is imperative to secure adequate financing and proper financial control. Allowing technical considerations into the budget will also help you identify constraints or bottlenecks in your operation.

We will continue to build AKVA group with this as our mission. We will be focused on our customers’ needs, being attentive and responsive. We will develop and use our knowledge to contribute solutions and services that lift your customers performance.

We will take pride in being reliable and honest in what we do and how we act, and we will use our enthusiasm to generate the energy and joy needed to bring our customers as well as AKVA group forward.

In AKVA we strongly believe that we can make a difference. We are proud to be part of the global aquaculture industry which is playing a crucial role providing healthy seafood world wide.

We are partners – and in it for the long run.

AKVA group is a solid partner with offices and facilities in Norway, Chile, Denmark, Scotland, Iceland, Spain, Greece, Turkey, Iran, Canada and Australia. With 11 offices and several agents and distributors around the globe AKVA group is present in all markets worldwide. AKVA group is a unique partner with the capability to offer both cage farming and land based aquaculture operations with complete technical solutions and service.

The company holds strong, well-known brand names and the product line range from plastic and steel cages, mooring systems, nets, net cleaners, work boats, feed barges, feed systems, camera systems, environmental sensors, underwater lights, production and process control software, recirculation systems, PE piping systems, farm design, on-site services and training courses.

Partnering with AKVA group allows customers to keep their focus on fine tuning farm operations to increase profitability, while sharing the technical challenges with a reliable partner with the right people, the right technology and the right knowledge to achieve excellence.
Land Based Aquaculture

**PRODUCTS**

- Underwater Lights
  - Light treatment is successfully used for smolt and juveniles in tanks and cages of different types and sizes.

- Feeding systems
  - The Akvamart CCS Feed System will feed the correct amount, at the optimal rate, on time, every time.

- Sensor systems
  - Environmental sensor data are of vital importance. A better environment will always improve your production.

- Piping and pipework
  - AKVA group has one of the most modern production lines for polyethene pipes in Europe and thousands of kilometres have been delivered since 1971.

- Tank solutions
  - AKVA group tanks can be customized to any desired diameter and height thus making it possible to obtain perfect utilization of the available site space.

- Water treatment
  - AKVA group has 30 years experience providing optimal water quality conditions for both fresh- and seawater operations.
Advanced aquaculture needs professional maintenance

As aquaculture equipment becomes more advanced, the need for professional service and preventive maintenance increases. AKVA group offers global professional service on all products. Through on-site visits, AKVA group technicians will get a complete overview and understanding of specific solutions on the site, specific requirements, preferences and work routines of local staff.

Sufficient training of your staff and managers will minimize the amount of frustration that builds up while browsing through a manual in search of a solution to a problem. Training of staff, face-to-face is always a smart investment.

AKVA group ASA may, in cooperation with Eksportfinans, offer competitive financing to foreign buyers. Eksportfinans, the Norwegian export credit agency for Export Financing, is owned by banks and the Norwegian Ministry for Trade and Industry.

Rental*

AKVA group offers rental of complete systems as well as single products with service included. We have a very skilled and experienced service network and our new rental agreement allow our customers to focus their attention on feeding fish, while we make sure that the equipment is continuously performing.

*Not offered in all areas.
Professional service, maintenance and training

As aquaculture equipment becomes more advanced, the need for professional service and preventive maintenance increases. AKVA group offers global professional service on all products; on or off location including:

- Fixed pricing on reconditioned critical spare parts with guaranteed local availability.
- Technical telephone support during local office hours.
- Professional consultancy services.
- System upgrades, including fixed pricing on specific rebuild kits.
- Fast service response times.

The main overview provides fast access to the present state of the entire system.

Prioritized 24 hour telephone support
Global professional service on all products
Dedicated AKVA group service representative during office hours
Status report with yearly documentation of the site
Discount on AKVA group training programs
Discount on spare parts
Discount on software upgrades

Software support can include training, online support, consulting, implementation, server control & server security.

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With a service agreement, the farm manager can focus completely on the fish, while our technical staff looks after the equipment.

AKVA group offer a regular service visit with equipment control and maintenance, including detailed status reports.

AKVA group offers a wide range of advanced aquaculture technology, and provides customized product training on demand.

Regular service prevents downtime, and thus ensures predictable and uninterrupted production.

Experienced service personnel on-site.

Regular service

Complete remote control

Turning a software solution into the optimal work tool requires understanding about local knowledge, work routines and preferences.

1. On-site support, telephone support, online support
2. Implementation
3. On-site, in depth training
4. Upgrading of licences
5. Consulting
6. Tailor-made solutions
7. Securing long time investments

Customized courses

On-site training

Experienced and highly qualified AKVA group personnel will teach the classes, both at the main courses and out on the customer’s locations.

Preparing, Training, Follow-up

All training programs are tailor-made and planned in close cooperation with the customer. Further on, and to ensure the highest possible learning outcome, the following stages are followed:

1. Individual self-paced preparation phase
2. Face-to-face training
3. Close post-training follow-up

Well trained employees is a smart investment. It will improve the results and reduce down time.

The main overview provides fast access to the present state of the entire system.

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Experienced service personnel on-site.

Off-line service and support.

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Well trained employees is a smart investment. It will improve the results and reduce down time.
Rental agreements with professional service and support included*

AKVA group Services rental concept is offered for a number of products such as e.g. feed systems, feed accessories, camera systems, environment-sensors, infrastructure, dead fish systems, underwater lights, washing systems, subsea feeder, etc.

The rental concept has been developed in cooperation with our customers, and it is evident that more and more customers prefer rental instead of traditional purchase. Much of the reason for this is peace of mind and fixed monthly costs.

A rental agreement allows you to give the fish priority, while AKVA group ensures optimum functionality and operation of the systems. A rental agreement gives you the most modern equipment.

A rental agreement may include:
- Transport of complete rental equipment**
- Installation and start-up
- Training in using the system
- Service and support of the rental equipment is included, which ensures high uptime and optimum configuration
- Repairs or replacement of defective equipment free of charge
- Fixed price for the entire rental period
- No front-end fee
- Free access to support

The customers may themselves choose between several different rental periods that may be individually customized. Rental agreements from 2–8 years. Our aim is that you will have state of the art equipment at all times and as worry-free operations as possible.

* The rental agreement is not available in all areas.
** Transport costs may vary.
The most optimal solutions

A few years ago it was hard to imagine a supplier of complete land based aquaculture solutions. Today AKVA group steps into that role, with all the commitment and dedication it takes to become the preferred supplier-, maintenance-, service- and training partner for such companies worldwide.

Your partner in advanced water treatment technology

AKVA group has more than 40 years of aquaculture engineering experience. Our team of world leading experts is renowned for designing sustainable recirculation systems that are second to none. Having delivered systems globally for more than 20 different species, AKVA group provides optimal water quality conditions for both fresh- and seawater operations.

One of the main advantages of the Recirculation Aquaculture System (RAS) maintains a perfect environment with superior water quality at minimum cost. All significant water parameters are monitored online and adjusted accordingly; ensuring optimal fish health and growth. This is the foundation for predictable aquaculture production and superior harvest quality for all species.

The first step towards your own Land Based Farm is to enter into a pre-project agreement with us. Once this is completed, then you are all set to go ahead with a successful project!
AKVA group offers a wide range of land based aquaculture technology, from single components to complete water treatment installations worldwide. The dedicated range of quality products and software solutions provides maximum reliability and cost effectiveness.

**Flow through system**
The traditional form of land based aquaculture with low level of water treatment technology. This form of aquaculture is commonly used on sites with vast amounts of water with a good temperature profile.

**Re-use system**
Re-use is often a result of a gradual increasing implementation of technology including for instance oxygenation and degassing. Depending on the level of technology, the Re-use relative to flow-through is often between 20 and 60%.

**Recirculated system**
Recirculation systems are currently being built all over the world and for many different species. A high level of technology allows a very high degree of water Re-use; normally in the range of 95-99% compared to the water consumption in a flow through system.

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*Feed Systems*
AkvaSmart CCS Feed Systems are integrated with the Recirculation Systems. Both centralized blower systems with Rotor Spreaders, and individual tank feeders, are connected to the AkvaConnect software. All systems are feed care optimized to preserve pellet integrity.

*Split-Loop design*
To obtain optimal stability of water parameters the flow pattern must be designed to correspond to the system loading. System performance is improved by the use of the Split-Loop design with lower flow rates through the Biofilter and higher flow rates over the Degasser, thus creating a perfect balance of biological nitrification and physical degassing processes.

*AKVAConnect Software*
AKVAConnect is the new “umbrella platform” controlling both equipment and software.

*Oxygen Control*
Stable oxygen levels are essential to all aquaculture systems, as periodical drops in oxygen levels reduce fish appetite, and increase stress levels and mortality.

*Mechanical Filter*
An efficient mechanical particle filter removing particles larger than 40 microns. This is crucial for optimal bio filter performance and general pathogen control.

*Biofilter*
The fixed fluidised Biofilter combines high performance with simple maintenance and low operating costs. This multi-step concept has been developed for ultimate biofilter stability.

*CO₂ Degasser*
The CO₂ Degasser provides efficient CO₂ removal at low energy costs, including efficient stripping of nitrogen.

*UV Filter*
The UV Filter provides efficient ultra violet water disinfection at low costs. This design results in very low head loss.
Tanks for production

Dedicated tank design
The production unit design is imperative for a successful rearing facility, and the solution depends highly on the behavioural pattern of the species. The tank system should be designed to optimize the water flow characteristics so that exact water exchange rates for the different species and fish sizes can be achieved.

Tailor made solutions
AKVA group tanks can be customized to any desired diameter and height thus making it possible to obtain perfect utilization of the available space on the site. For fast swimming species, such as Atlantic Salmon, a general recommendation is to have a diameter to depth ratio of approximately 3:1. Diameter to depth ratios in this area will provide good self-cleaning of the tank and at the same time make it possible to avoid powerful vortex in the centre of the tank that could otherwise trap the fish.

Low tank maintenance
All tanks from Plastsveis have High Density Polyethen (PE) inner liner which is a highly hydrophobic material making the tanks stay clean. Keeping the tank walls clean is a very important measure in preventing outbreak of disease. The potential hazards of a dirty tank wall are currently receiving increasing attention from scientists demonstrating that this may give pathogenic bacteria an opportunity to colonize and grow and subsequently infect the valuable fish. The inner liner is also very smooth to prevent fish from getting wounded when in contact with the tank walls. The outer mucus layer and the scales on the fish is their primary immune system and preventing damage to this is one of the most important keys to securing a healthy and fast growing fish.

A popular steel tank solution with Polyethen (PE) inner liner.

High quality walkways and platforms that provide a safe and stable work environment whilst allowing a better utilization of the available space.

AKVA group tanks can easily be customized to any desired diameter and height

The two tank models from AKVA group are Polyethen tanks (above) or Steel tanks with Polyethen inner liner.

Larger tanks are reinforced with corrugated steel plates for additional safety and to ensure that the tank keeps it shape and that the hydraulic properties of the tanks remain optimal at all times.

Decades of experience combined with cutting edge equipment for producing the tanks makes it possible to fabricate tanks in any size that can be shipped anywhere in the world at a low cost.

Our team of experts will always perform the mounting of the tanks on site to ensure that every delivery meets our high standards.

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Advanced Fish Tank Technology

Having delivered more than 1,500 fish farming tanks, we have acquired unique expertise in designing and delivering tanks and technical solutions for land-based aquaculture.

We’re focused on enabling our customers to carry out their tasks in a safe and efficient manner. We achieve this through a practical approach to the tasks and strong focus on providing flexible solutions that meet the requirements of both the fish and the farmer.

The tanks can be customized and built to different dimensions, providing optimum utilization of the available space at the facility. All tanks are installed with an internal hard HDPE liner, a highly water-repellent material that contributes to keeping the tanks clean.

**Optimal optical environment**
By choosing the optimum colour of the HDPE liner, the fish have better conditions for growth. The liner can be installed in the coloration of the species and farmers preference. A light shade of grey helps in terms of light management and works very well for salmon.

**Fish tanks**
Fish tanks with corrugated, galvanized steel reinforcement provide a robust and secure structure. Slippery, hydrophobic HDPE internally contributes to a clean and healthy environment for the fish, which contributes to better fish health and lowering risk of disease.

**Adjustable centre pipe**
Retrieval of dead fish is simplified with an adjustable centre pipe. The centre pipe’s distance from the bottom adjusts the water speed and allows appropriate suction to the size of fish and pellet. In normal operation the pipe is set to continuous retrieval of dead fish, feed remains and faeces.

**Fish transportation systems**
Efficient and safe systems for moving, sorting, counting and vaccination of fish are essential in modern, land-based facilities. Connecting the fish tanks with proprietary, seamless quick connections make the logistics easy to use and safe.

**Replaceable grate systems**
Grates installed externally in the side drainage box are easy to replace to adjust the strain opening to the size of fish and pellets. Customized grates ensure maximum flow and also increase self-cleaning.

**Inlet jet pipe**
The inlet jet pipe are key to ensuring water speed adjustments and optimum swimming conditions for the fish. This result in strong healthy fish with the lowest possible feed conversion ratio.

**Side drainage box with dead fish collection**
The collection and registration of dead fish can be carried out very efficiently, by placing the side drainage boxes at a shared platform with an appropriate working height for for operators. Unnecessary stressing of the fish is avoided by handling dead fish outside the tank.

**AKVA group is a leading manufacturer of modern smolt-raising facilities.**
AKVA group has one of the most modern production lines for polyethen pipes in Europe and thousands of kilometres have been delivered since 1971. The pipes are straight pressure pipes made from PE raw materials especially suited for continuous use in harsh environments, and are based on decades of experience in pipe technology. Polarcirkel pipes are available in a wide range of models, shapes and sizes to suit individual needs and offer many benefits over competing systems.

No corrosion or decay is caused by the electrolytic process and no risk of material deterioration as algae, bacteria or multicellular organisms are unable to attach themselves to the pipes. Polarcirkel pipe production is certified under Det Norske Veritas (DNV), ISO-EN 9001/ISO 14001 Standard and NS-EN 12201.

All installations are carried out by certified welders which ensure accurate and quality assured installations of PE 100 pipes.

AKVA group provides Polarcirkel solutions for water supply, outlet pipes, internal pipes, parts and fittings for hatcheries and land based aquaculture.

Maintenance free, flexible solutions

Extruder- and butt-welding PE is a proven and strong method of joining piping components.

AKVA group offers a wide range of pipes and fittings from 20mm up to 1000mm diameter.

Water and sewer
AKVA group offers a wide range of Polarcirkel PE pipes for underground water supply and sewage, all with outstanding performance advantages such as joint tightness, flexibility, abrasion resistance and extremely long durability.

Maintenance free pipes
AKVA group produces PE pipes with state-of-the-art machinery, and offers complete pipe systems for high and low pressure applications. High quality raw materials are used throughout, and full documentation of the pipe production process can be provided by an in-line scanning system. This provides cost savings as well as ensures long, maintenance free lifespan of the pipes.

PE piping and plumbing parts are suitable for a wide range of industrial use, chemicals, corrosive fluids, sewage, sludge, water, food and agriculture granulates.

Sophisticated machinery produces pipes in a wide range of models, shapes and sizes to fit individual needs.

Feeding Pipes in various dimensions, wall thicknesses and coil lengths up to 1000 metres.

Industry and processing
The excellent corrosion and chemical resistance properties and long-term durability of PE pipe has resulted in the mining and process industries choosing polyethen as their preferred pipework material.

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A complete pipe range

Reliable custom pipe production with state-of-art technology.

Polarcirkel PE-100 Pipe Dimensions

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<th>SDR17 e (mm)</th>
<th>SDR17 kg/m</th>
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<th>SDR13.6 kg/m</th>
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</table>

OD = Outside diameter  e = Minimum thickness  Kg/m = weight per meter pipe  * Contact us for more details

AKVA group can supply all you need for a complete PE-pipe installation

Custom welded or pressure injection moulded Polarcirkel PE pipe fittings, including: elbows, bends, tees, caps, stub ends, reducers, bushings, adapters, strainers, manifolds, flange systems, electro couplings etc. All in sizes from 20mm to 1000mm OD.

AKVA group’s Polarcirkel pipe production is certified under Det Norske Veritas (DNV), ISO-EN 9001/ ISO 14001 standard and NS-EN 12201.
Effective and reliable particle filtration

Mechanical filters for; inlet water filtration, effluent water filtration, filtration in recirculation systems and re-use systems

Filtering the inlet water to the farm will secure clean water by reducing the organic loading from outside and reducing the impact of invasive organisms. Also treatment of outlet water from farms before discharge is most often done efficiently by the use of mechanical filtration removing faeces from the farming process. In the recirculation farms, the main purpose of the mechanical filter is to remove the organic particles inside the system to secure a low and stable concentration of organic matter for keeping the biofilter performance optimal at all times.

Key points
- More capacity per m² filter area than seen before. Drain perfectly for minimal sludge water each m³ filtered water. Durable and easy to replace.
- High efficient SEW gear motor with speed regulation and soft start directly on the gear, no shielded cable needed during installation.
- Heavy main construction of drum, frame and with duplex chain drive for strong and soft pull.
- Fully UV resistant PE main cover, PE motor cover and PE chain box to avoid any corrosive issues.
- Standard mounting option for installing spray pressure pump directly on the filter frame.
- Option for control that regulates the duty of the filter measuring actual differential pressure. Optimizes the water and power consumption dramatically.

A screen size of 40 - 50 micron (μm) is normally the best choice for reducing the organic load with minimal head loss.

The filter is also designed to withstand the environmental conditions: Filters for aggressive warm saltwater will be delivered in Duplex steel or AISI 316, and for colder freshwater conditions the use of less costly material, such as AISI 304 steel, can be used.

The new Mechanical filters are now supported worldwide with staff specialised in aquaculture.

AKVAconnect provides the ability to gather data and combine information from all levels of the operations.
New built-in UV solution

Smart-Ray is a new concept that integrates our well-known product standards and control system with flexibility and easy installation. We now offer an industrial size UV disinfection system for both water intake and internally within the fish farm environment.

The Smart-Ray system coupled with AKVAconnect, our new control system that secures an uncontested security in production. A smart control of the UV-Dose relates to the current quality of the water, adjusts, and insures a perfect balance between efficiency and energy consumption.

From low UV treatment to full water sterilization

This is done by applying ultraviolet light (UV) only to a carefully calculated portion of the water flow in each cycle. It is a common misconception that sterilizing all the water will control the bacterial dynamics in the rearing unit. However, as bacteria grow very rapidly on organic material, sterilizing the water would in fact have a destabilizing effect on the system. By only partially UV treating the water flow, the healthy and useful bacteria from the biofilter are allowed to dominate and suppress pathogenic bacteria. This prevents outbreaks of disease, and thus ensures maximum biosecurity.

Our balanced probiotic UV concept ensures optimal conditions and fish welfare

Effective filtration ensures a low and stable load of organic material, and is therefore crucial for the performance of the biofilter. (Open UV solution)

Inactivation of pathogenic microorganisms - various doses of UV rays

Our UV lamp emit rays at 254 nm. This destructs all vital cell processes and DNA/RNA synthesis.

Detailed UV data is supplied from the new AKVAconnect software platform.
AKVA group offers the best pumps available on the market.

Custom designed pumps ensure maximum operation

All components in the AKVA group Recirculation System have been carefully designed to ensure minimal head loss. Therefore, the water only needs to be lifted a minimal height by the header pumps for each cycle.

Reliable performance - almost maintenance free

The highly reliable pumps can also be delivered in saltwater resistant materials. These custom made propeller type pumps are extremely efficient for lifting large amounts of water with low head, and frequency control ensures optimal RPM and a long lifespan. Therefore, the recirculation system water flow is perfectly tuned according to the biomass in the system.

Perfectly tuned water flow

Industrial quality pumps from AKVA group have high performance and extra low maintenance.

Pump Models

- KPL Axial flow propeller pumps
- NB Single stage end suction pumps
- CR Multi stage centrifugal pumps

Benefits:

- Smart choice for CO₂ degassing
- Turbulence Optimiser™ for best-in-class hydraulic efficiency of up to 85%
- High-voltage motors for low installation costs
- High-precision one piece propeller with back-swept design reduces clogging
- Ideal in oxygen cones
- Optimised hydraulic in housing and impeller for unimpeded liquid flow
- O-ring seal between pump housing and cover means no risk of leakage
- Housing, impeller and wear ring in different materials for improved corrosion resistance
- Perfect washdown pump for drum filter cleansing
- Available with Blueflux IE3 motor efficiency, reducing energy costs
- Multi-flange fits a variety of standard connections for a flexible solution
- Uniquely designed cartridge shaft seal increases reliability, reducing downtime

Technical data:

| Motor size: | 11 - 600 kW (up to 850 kW on request) | 0.55 to 200 kW | 0.37 - 75 kW |
| Flow rate: | 9,200l/s (33,120 m³/h) | Up to 1450 m³/h | Maximum 180 m³/h |
| Head (H): | 10 m | 150 m | Maximum 400 m |
| Liquid temperature: | 0 to +60 °C | -25 to +140 °C | -40 °C to +180 °C |
| Discharge diameter: | Up to 2200 mm | DN32 - DN250 | Up to DN9 150 |
| Maximum installation depth: | 20 m | 88,9% | 80% |
| Maximum hydraulic efficiency: | 16/25 bar - system pressure | 24 bar - operating pressure |

Variants:

- Propeller available in a variety of materials
- Sensors for monitoring the pump, bearing and winding temperature, vibrations and water in oil
- Available in a number of shaft seals and material variants
- Coating for seawater installation on request
- Cast iron
- Two grades of stainless steel
- All-titanium

Applications:

- CO₂ degassing, biofilter
- Oxygen cones
- Lifting pumps for CO₂ degassing
- Washdown pump for drum filter cleansing
Accurate CO₂ stabilization

Control of carbon dioxide levels is essential for producing a healthy and fast growing fish both in flow through and in recirculated aquaculture systems. Through extensive experience with degassing both for fresh- and saltwater species AKVA group has developed systems that are both efficient and durable. The use of composite and PE materials with hydrophobic properties ensures low maintenance and products that last even in saltwater.

Negative pressure inside the degasser pulls even more CO₂ out of the water. In addition, the built-in ventilation removes all the extracted gases and humidity from the building, significantly improving the degassing efficiency as well as the work environment for the employees.

The extremely high efficiency of the degasser reduces the total gas pressure in the water, making the oxygen diffuse more readily. This reduces both energy and oxygen consumption.

With the most effective degasser on the market, AKVA group is able to offer the best CO₂ levels at the lowest possible running costs.

Low and stable CO₂ levels is one of the most important success criteria in commercial aquaculture.

Improved degassing allows higher pH

The degasser provides efficient CO₂ removal at low energy costs, including efficient degassing of nitrogen.

By installing a degasser, CO₂ levels decrease significantly and become more stable.

Low and stable CO₂ levels have documented effects on welfare, feed conversion ratios and growth.

The high efficiency of the degasser also allows for higher pH values which are optimal for fish welfare as well as the bacteria inhabiting the subsequent biofilter.

The degasser can also be an integrated part of each tank; either installed inside the tank or just outside.

Modularized polyethen degassers with active ventilation can be offered in a wide range of sizes.

The degasser design provides a large water surface area for diffusion of gases from water to air.
**Effective removal of ammonia**

**The multi-step technology**

AKVA group’s multiple chamber biofilter design provides optimal conditions for the biological process of breaking down ammonia. The key is to ensure that the organic material is consumed by heterotrophic bacteria early on in the biofilter.

The heterotrophic bacteria multiply more rapidly than the nitrifying bacteria and will therefore dominate the filter if given the chance. The absence of organic material in the subsequent chambers ensures ultra thin biofilm on the filter media, thus provides optimal conditions for nitrification.

The fixed fluidized biofilter technology combines the low operating costs of a fixed filter with the high surface-to-volume ratio of a fluidized filter. This ensures effective removal of ammonia at minimum operating costs.

The special construction of the biofilter, combined with the simple, yet clever design of the media, provides an even water flow with maximum bacteria surface contact. The relatively simple design of the media further reduces the demand for biofilter cleaning, which can therefore be fully automated.

AKVA group’s Biofilters creates optimal conditions for nitrification.

AKVA group’s multi-step technology provides a stable biofilter performance, even at high pH levels and low total ammonia levels.

The Microparticle filter provides a very clean water making it easier to maintain visual control over the valuable fish.

Conversion of ammonia to nitrite and further to nitrate in AKVA group Reactor Biofilter. Notice! Removal of nitrate does not become effective until TAN is completely removed.
Oxygen Control

High oxygen levels are essential

Oxygenation must be efficient and safe

Correct oxygen levels are essential for high fish welfare and growth in all aquaculture systems. In modern farming the use of pure oxygen has become a vital parameter in reaching production goals. Efficient and reliable systems for pure oxygen injection is therefore of utmost importance.

The injection of pure oxygen to the process water can be accomplished in different ways:

• Oxygen Cones operating at high pressure placed centrally or next to each tank to secure optimal mixing of oxygen into tanks.
• Venturi Injectors specially designed for saltwater conditions making use of the jet effect to increase oxygen uptake in the water
• Low Head oxygenation using the higher water pressure at the bottom of wells or shafts to increase the efficiency of dissolving oxygen in the farming system
• Leaky Pipes used for simple diffusion most often used in emergency situations or to handle peak situations for short periods of time.

High oxygen levels are essential

The new Multi Sensor connects directly to the feed system and can stop the feeding at low oxygen levels.

If the oxygen supply stops, the oxygen security units will automatically provide extra oxygen.

AKVAconnect oxygen software ensures full control and optimum security.

Detailed oxygen data from each tank on the location.

Oxygen enriched water will increase fish growth.

High pressure pump sections efficient injection.

PID registration of oxygen dosing provides more stable oxygen concentration

Reduction in appetite
Low appetite or mortality
Massive mortality

Stable oxygen levels are essential to all aquaculture systems.
AKVAflex is a new innovative AKVA group concept that integrates our well-known recirculation technology and sophisticated AKVAconnect control system in a flexible and easy installation. As a result of innovation and recent developments it is now possible to get an industrial size recirculation system pre-installed with a minimum on-site setup time, no matter where you want to install it worldwide. Our state of the art recirculation system coupled with the market leading control system AKVAconnect secures an uncontested security in production considering water quality and fish welfare.

If you want to move the unit to another site or recirculate another tank, simply lift the unit to its new position and hook it up - and you are ready to go!

Installed in a standard container the AKVAflex is easy and cheap to transport anywhere. Everything is pre-installed and secures a smooth installation on-site.

**Innovative recirculation system pre-installed with a minimum on-site setup time.**

**Features:**
- Modular design: Easily adapted to any farm, easily moved to other locations
- Container based: Pre-installed - no concrete work, short installation time on site
- Well proven technology: Safe and predictable production with temperature control
- AKVAconnect – control system: Flexible control system, optimal equipment can easily be connected
- Flexible solution: Possible to attach a wide range of tank sizes

**Specifications:**
- Daily maximal feed: 225kg feed/day
- Flow to tanks: 400m³/h (111 L/s)
- Water exchange: 4m³/h (67 L/min)
- Energy consumption at full load: 22kW
- Connections: (4)202mm inlet and outlet
- Size: L 13m x W 2.0m x H 4.7m

**Benefits:**
- Easily adapted to any farm
- Easily moved to other locations
- Pre-installed - no concrete work
- Short installation time on site
- Safe and predictable production with temperature control
- Flexible control system, optimal equipment can easily be connected
- Possible to attach a wide range of tank sizes

**AKVAflex base unit includes:**
- 3 Biofilters
- Microparticle filter
- CO₂ Degasser with active ventilation
- Mechanical filter
- Frequency regulated main pumps
- Sludge pump
- Blower for biofilter aeration
- Dosing pump for NaOH addition
- pH, O₂, CO₂ and level sensors
- All internal pipe work, all valves and all mechanical installations
- All electrical installations including electrical cabinet
- Complete AKVAconnect control system with computer and sms alarm

**AKVA group products fully compatible with AKVAflex:**
- UV-system
- Emergency oxygen system
- Oxygen cones and pumps
- AKVAconnect integration of existing solutions and equipment on site
- Measuring probes
- Container based inlet water unit
- Container based heating unit
- Feed systems
- Underwater or above tank lights
- Camera systems

AKVAflex can also be integrated with existing equipment on the site or delivered with additional equipment.
Matches fish appetite

The central feed system concept was invented by AKVA group in 1980, and Akvasmart CCS is today the most popular and reliable feed system worldwide. The system is suitable for all species feeding on pellets. It is now also fully integrated with camera control and environmental sensors, as well as Fishtalk production control software. All feeding and environmental data is stored in the Fishtalk database. This unique integration allows for full overview and control of all operational activities, from farm site to top management.

The Akvasmart CCS Feed System will feed the correct amount, at the optimal rate, on time, every time. This powerful system provides great opportunities to optimize the entire feeding process.

AKVAconnect is the leading edge feed system software, now part of the Fishtalk software family. New functionality includes meal planner, group feeding and adaptive feeding. Combined with data from environmental sensors, this allows for efficient analysis and benchmarking between farm sites.
CCS Feed System

A feed system adapted to your production.

The Akvamart CCS Feed System is designed to handle more than 40 feed lines running in parallel, or a combination of feed lines and regular electric feed hoppers. All controlled from one single computer. In 2013 we launched AKVAconnect Feeding; a specialized control system for land based aquaculture operations.

All Akvamart CCS Feed Systems and components are feed care optimized to preserve pellet quality room silos to fish.

Feed Silos:
Up to 8 silos can be connected in series for each feed line.

Feed Dosing:
With capacities from 0.6kg/min up to 192kg/min. Up to 8 dosers can be connected in series for each feed line.

Feed Selector:
The Feed Selector Valve is designed to be as gentle on the feed as possible, and provides a reliable link between feed system and tanks.

Cleaning Plug Injector:
The injector will blow the plugs one by one, cleaning the feed system using transport air.

Air Control System:
Regulated air speed ensures optimal pellet flow, significantly reducing the risk of blockage and breakage. The air control system is also an important tool for optimizing feed spread in a tank or in a cage.

Preventing only 1% feed waste on a larger fish farm, can easily increase the bottom line by 50-100,000 US$.

Feed Pipes
High quality and durable Polarcirkel Feed Pipes are available in various dimensions, wall thicknesses and coil lengths up to 1000 metres.

Air Blower:
Generates transport air for the feed system. The air blowers are frequency regulated to allow perfect air speed for each individual tank or cage.

AKVAconnect Air Cooler:
Reduces the temperature of the transport air. Too high temperature may cause lipids to be released from the pellets and even proteins to be denaturated. This will lower the nutritional value of the feed.

The Akvamart CCS Feed System is suitable to feed most species of fish, on land and at sea.

Underwater lights are often installed to improve growth rates and feed utilization.

Accurate monitoring and logging of the environmental conditions is provided by a wide range of sensors.

Laptop/IPAD/SmartPhone

Fishtalk
Feed accounts for 60-90% of the production cost in most fish farming around the world today. That makes every pellet count when it comes to financial results.

AKVA group Feed Care Program

Commercial Scale testing
AKVA group has developed a special durability test machine (Doris) that makes it possible for fish farmers and feed manufacturers to test and document the physical quality of different feed types before releasing to the market types. We work closely with experienced feed suppliers to optimize feed handling.

Important elements in the feeding process
- Feed storage, how to:
  - Fill silo
  - Store feed
  - Take feed out of silo
- Pellet transport:
  - Pipe work
  - Connections
  - Adjustment
  - Cleaning
- Air transport:
  - Air temperature
  - Cooling
  - Air speed
  - Back pressure
- Adjustment in control system:
  - Feeding speed
  - Air speed
- Feed spreading:
  - Type of spreader
  - Spreading area
- General maintenance:
  - All equipment

All issues above are down to how to transport the pellet undamaged to the fish!

Centre of Aquaculture Competence, CAC. The world’s largest test site for salmonids is owned by Marine Harvest, Skretting and AKVA group.

Preventing up to 3% feed waste
It is quite common for many large scale fish farms today to spend 10-20.000 US$ average per day in fish feed. Preventing only 1% feed waste (dust and breakage) can add a total of 50-100.000 US$ to the bottom line each year! Consequently, it is critical that your feed system reliably deliver the feed to the fish 100% intact, at the correct rate, exactly the amount the fish wants to eat and with the optimal spread.

Our patented feed test unit “Doris”, is also used by leading fish feed manufacturers and other aquaculture companies.

Graph showing how pellet speed influences dust and breakage.

Video control of the pipes
Monitoring and regulating the transport air speed is one of the most important factors. “Speed kills” also when it comes to feed systems, and only a 10-20% reduction of transport air speed make a significant reduction in feed dust and pellet breakage. This is where most of the feed dust has been created historically. Using the Air Control System combined with our highly effective (low friction start) Rotor Spreaders allow reduction in air speed while still getting excellent spreading.

All feed system equipment is tested by experienced AKVA group technicians to make sure all equipment meet our high standard.
Air Blower, Air Cooler and Air Control

Feed Blowers
The blower generates the air pressure to transport the feed to each tank/cage. The combination of an air control system and frequency regulated blowers makes it possible to optimize the pellet transportation. The air speed can be adjusted to optimize both feed spread and gentle feed handling. The blowers are delivered in high quality silencer cabinets which ensures a comfortable work environment.

Air Coolers
Depending on the transport distance and ambient temperature, many feed systems will benefit from installing an air cooler. Too high temperature may cause lipids to be released from the pellets and even proteins to be denaturated. This will lower the nutritional value of the feed. If the lipids are released from the feed during transportation, this will increase the risk of pipes being blocked hence increasing the need for pipe cleaning.

Air Control System
Akvasmart Air Control System with regulated air speed ensures optimal pellet flow, significantly reducing the risk of blockage and breakage. If the pellet/air speed is too low, the risk for pellet blockage is increased. If the pellet/air speed is too high, dust and breakage is increased. The system also monitors and logs air speed, back-pressure and temperature.

AKVAcortic provides detailed feeding data from the silos to the tanks.

The feed enters the air flow through the Doser Valves and is then blown through seamless stainless pipes and up to the Selector Valves.

Sound protected machine room with Feed Blowers and generators.

Feed blowers and air coolers come in a variety of models.

The air cooler pipe is cooling the transport air from the feed blower.

AKVAconnect process control software offers special alarm functions.

The Air Control unit is installed between the Air Cooler and Feed Doser Valve.

The Air Control system is visualized in AKVAcortic through a simple graph per feeding line. The graph displays real-time data for each unit being fed.

Too low pellet speed.

Optimal pellet speed.

Too high pellet speed.
A critical part of the feed transport

Feed Doser Valves
A custom Feed Doser Valve is used to transfer the feed into the air flow. As this is a critical part of any feed system, it is important that only FEED CARE OPTIMIZED equipment is used. In order to meet all our customer’s needs, we can offer both Feed Doser Valves and Feed Augers with Sluice Valves for this purpose. The CCS Feed Doser Valves are designed in two main models. Vari Doser 1500™ and Feed Doser 4000™.

Service and cleaning of the feed doser can easily be done in 30 minutes.

The Feed Doser Valves have capacities from 0.6kg/min. up to 192kg/min.

Silo Systems
A wide range of different feed tank solutions and sizes can be delivered to suit any requirements. We can deliver square or round silos in both aluminum and steel. Contact our sales department for more details and specifications.

Feed Augers can be delivered in wide range of types, shapes and sizes.

Feed Auger
The Feed Auger is a well proven solution to transfer the feed into a gate valve. The Auger provides more flexible installation, simpler pipe systems and easier maintenance.

<table>
<thead>
<tr>
<th>Feed Auger/Dosers</th>
<th>Feed Auger</th>
<th>VariDoser Start</th>
<th>VariDoser</th>
<th>Doser 4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. feed rate (kg/min)</td>
<td>1.2</td>
<td>1.8</td>
<td>6</td>
<td>1.2</td>
</tr>
<tr>
<td>Min. feed rate pulse (kg/min)</td>
<td>0</td>
<td>0.9</td>
<td>4.5</td>
<td>0</td>
</tr>
<tr>
<td>Max feed rate (kg/min)</td>
<td>100*</td>
<td>24</td>
<td>75</td>
<td>150</td>
</tr>
<tr>
<td>Material</td>
<td>316 Stainless steel</td>
<td>Polyethylene (PE) / Cast iron / Stainless steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>55kg</td>
<td>75kg</td>
<td>75kg</td>
<td>95kg</td>
</tr>
</tbody>
</table>

* With appropriate settings
The feed selector valve is the connection point for the PE transport pipe, located in between the feed silos and the fish tank/pond. The object is to select correct tank/pond so the feed are distributed correctly.

Our product line includes a variety of selector valves both regards to transport pipe size and pipe outlets.

A new improved construction makes the Feed Selectors easier to open, clean and maintain.

Akvasmart Feed Selectors have a max feeding rate for each feed line of 192kg/min. Up to 60 feeding pipe connections on each selector and pipe lengths up to 1400m.

A new rugged pipe restrainer makes it easier to replace the pipes.

CCS32 and CCS63 Feed Selector Valves are a perfect solution for tanks, ponds and smaller cages.

### Feed Selectors

<table>
<thead>
<tr>
<th>Feed Selector</th>
<th>CCS32</th>
<th>CCS63</th>
<th>CCS90</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE pipe dimension:</td>
<td>32mm (1&quot;)</td>
<td>63mm (2&quot;)</td>
<td>90mm (3&quot;)</td>
</tr>
<tr>
<td>Max pellet size:</td>
<td>5-7mm</td>
<td>6-12mm</td>
<td>25mm (1&quot;)</td>
</tr>
<tr>
<td>Outlets:</td>
<td>2-6</td>
<td>24-32</td>
<td>4, 10 or 24</td>
</tr>
<tr>
<td>Materials:</td>
<td>Stainless Steel/Aluminum</td>
<td>Stainless Steel/Aluminum</td>
<td>Stainless Steel/Aluminum</td>
</tr>
<tr>
<td>Weight:</td>
<td>45-55kg*</td>
<td>45-55kg*</td>
<td>50-65kg*</td>
</tr>
</tbody>
</table>

* Depending on model/ex. pipe restrainer
A complete, portable feed system in one small compact unit, provides better feed control and growth.

**A user friendly and affordable feed system**

Semi-automatic feeding system for fish farming. The centralized feeding system AKVA basic has been specially designed for use in all types of farms due to its versatility in installation, easy operation and maintenance. During feeding, the feed pipe is manually operated by a single person, in communication with a AKVA basic operator in order to coordinate on and off times.

The AKVA basic is loaded manually with 20-25 kg feed bags, has a standard capacity of 125 kilos. Silos with extended capacity are available upon request.

By opening/closing several guillotines strategically located on the system we are able to select the cage to be fed.

Easy installation, operation and low maintenance makes AKVA basic an ideal and reliable equipment on smaller locations or isolated farms.

**AKVA basic Feeding System**

A complete, portable feed system in one small compact unit, provides better feed control and growth.

**A compact solution for smaller locations**

The new feeding unit is made of a stainless steel case containing an Akvasmart blower, doser and control cabinet, which makes the AKVA basic a durable and reliable equipment.

**AKVA basic feed system**

<table>
<thead>
<tr>
<th>Equipment:</th>
<th>Silo capacity</th>
<th>Feeding pipe</th>
<th>Frequency Inverter</th>
<th>Air Cooler</th>
<th>Selector Valve</th>
<th>CCS Control</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard *</td>
<td>125kg</td>
<td>90mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Engine and Blower always works at 100% of capacity.</td>
</tr>
<tr>
<td>Upgrade 1</td>
<td>300kg</td>
<td>90mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Increased feed capacity in silo.</td>
</tr>
<tr>
<td>Upgrade 2</td>
<td>125kg 63-110mm</td>
<td>yes</td>
<td>-</td>
<td>-</td>
<td>yes</td>
<td>-</td>
<td>Decreases feed at clients needs.</td>
</tr>
<tr>
<td>Upgrade 3</td>
<td>125kg 90mm</td>
<td>yes</td>
<td>-</td>
<td>yes</td>
<td>yes</td>
<td>-</td>
<td>Accurate control of line air speed and feed calibration.</td>
</tr>
<tr>
<td>Upgrade 4</td>
<td>125kg 90mm</td>
<td>yes</td>
<td>-</td>
<td>yes</td>
<td>yes</td>
<td>-</td>
<td>Reduces temperature in the air flow.</td>
</tr>
<tr>
<td>Upgrade 5</td>
<td>125kg 90mm</td>
<td>-</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>Equipped with manual control for the Selector Valve.</td>
</tr>
<tr>
<td>Upgrade 6</td>
<td>125kg 90mm</td>
<td>yes</td>
<td>-</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>CENTRALIZES all parts of the system in one computer.</td>
</tr>
</tbody>
</table>

* The AKVA basic standard model’s size is 2x1x1m, manual operation and is equipped with; 22kW Blower, 4000 Doser, On/off Switch, Timer, Manometer and Emergency Stop.

AKVA compact system is larger with 20 - 40 containers, CCS Control and automatic operation.
Faster and even growth from excellent feed spread

**Rugged and user friendly**
The unique tank version of AKVA group’s famous Rotor Spreader concept provides exceptional circular feed spread in ponds, tanks and smaller cages. This means better and more even growth. All models have adjustable light weight aluminium rotor pipes that allow for lower air speed for start up and rotation. This means less feed fines and breakage, power consumption, back pressure, air temperature, noise and wear and tear on the feed pipes. Our unique ventilated Zenon bearing requires no regular cleaning and does not corrode.

**Twistable rotor tip in hardened aluminum adjusts spread area.**

The new ventilated bearing has extra low friction and requires no regular cleaning!

The light weight, yet strong construction, ensures reliable performance in rough weather and extreme climates.

### The Rotor Spreaders are easy to install and simple to maintain.

<table>
<thead>
<tr>
<th>Rotor Spreader</th>
<th>RS-22T</th>
<th>RS-63T/RS-63C</th>
<th>RS-90C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE pipe dimension:</td>
<td>32mm (1&quot;)</td>
<td>63mm (2&quot;)</td>
<td>90mm (3&quot;)</td>
</tr>
<tr>
<td>Max pellet size:</td>
<td>7mm (1/8&quot;) *</td>
<td>12mm (1/2&quot;) *</td>
<td>25mm (1&quot;) *</td>
</tr>
<tr>
<td>Recommended RPM:</td>
<td>50-100 *</td>
<td>50-100 *</td>
<td>50-100 *</td>
</tr>
<tr>
<td>Spread diameter (adjustable):</td>
<td>Approx. 3-12m Ø *</td>
<td>Approx. 4-12m Ø *</td>
<td>Approx. 5-18m Ø *</td>
</tr>
<tr>
<td>Height above water:</td>
<td>30cm (12&quot;)</td>
<td>50cm (18&quot;) / 1,2m (4&quot;)</td>
<td>1,2m (4&quot;)</td>
</tr>
<tr>
<td>Draft:</td>
<td>- / 1,8m (6&quot;)</td>
<td>- / 1,8m (6&quot;)</td>
<td>-</td>
</tr>
<tr>
<td>Total weight:</td>
<td>0,6kg (1.3 lbs.)</td>
<td>1,2 (3.6 lbs) / 30kg (66 lbs.)</td>
<td>30kg (66 lbs.)</td>
</tr>
</tbody>
</table>

* Depending on feed system and feed type
The Akvasmart CCS Feed System is designed to fulfill all feeding requirements, regardless of species or how you want to feed your fish.

The configuration of the system is based on the following factors:
- Transport lengths
- Biomass (feed amount)
- Number of units (tanks)
- Species

The capacity of the feed system depends on the technical quality of the pellet, the feeding regime as well as the length of the feed pipe.

We can offer three control cabinets in various sizes for the feed systems. Ask our sales offices for more specifications.
AKVAconnect is a powerful and advanced software for daily control of all your feeding processes. Combined with Akvasmart CCS Feed System, it is the most adaptable and user friendly system on the market. AKVAconnect is developed in close cooperation with fish farmers all over the world. This has resulted in full integration with camera systems, pellet- and environmental sensors.

**Biological approach**

The only feed system software with biomass regulated feeding regimes based on accurate monitoring of fish appetite and environmental data.

**Environmental sensor data**

Oxygen-, temperature- and current sensors are fully integrated in AKVAconnect. All sensor data are displayed in real time and logged for further analysis. This allows for optimal feeding at all times.

**Fishtalk software integration**

Data generated in AKVAconnect is accessible in Fishtalk Control, providing end-to-end production overview, control, analysis, benchmarking and reporting.

### Key functionality:

- Full farm overview at a glance
- System capacity planning
- Advanced meal planning
- Multiple group feeding regimes
- Hopper control
- Integrated feeding camera control
- Accurate Air Control System
- Powerful reporting and analysis tools
- Wizards

**The most adaptable and user friendly feeding system on the market.**

All feeding data is easily accessible in Fishtalk Control.

Alarm output to site alarm.

The feeding can be remote controlled from an iPad or smartphone.

Accurate monitoring of fish appetite.

Environmental data displayed in real time and logged.

Automatic or manual camera selection.

Feeding according to received data.
Akvasmart CCS Feed System for Shrimp Farming

Efficient and accurate feeding, blowing feed from central feed silos to each pond with excellent distribution

The computer controlled central feed system concept was invented by AKVA group in 1980 and Akvasmart CCS is today the most popular, efficient and reliable feed system worldwide. It is suitable for all shrimp species (using extruded or high quality pelleted feed).

The feed is stored in centrally located feed silos and an air blower transports the feed up to 750m through 90mm HDPE pipes to each pond, where the air driven Rotor Spreader distributes the feed over a large area.

The entire process is computer controlled using the user-friendly, but advanced, AKVAconnect feed system software. The system can also be connected to oxygen and temperature sensors. All data are logged for later analysis and "best practice" benchmarking for feeding shrimp.

All systems and components are FEED CARE OPTIMIZED to prevent feed damage during transport.

The floating Surface Spreader is tied off in each pond to give all the shrimp easy access to feed and that uneaten pellets end up in the feed trays. The spreading area is individually adjusted in each pond depending on air speed, pellet size and spreader nozzle angle (max 10-15m diameter). The ventilated Zenon bearing is designed for harsh environments, low maintenance and long lifespan.

Having delivered tailor made systems globally for a wide range of species, AKVA group provides optimal feeding solutions and water quality conditions for both fresh- and seawater operations.

Black tiger and vannamei are the most common shrimp farming species.

Farmed shrimp accounts for 55 percent of the shrimp produced globally. Most shrimp aquaculture occurs in China, followed by Thailand, Indonesia, India, Vietnam, Brazil, Ecuador and Bangladesh.

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High quality pelleted shrimp feed.

Uneaten feed from the feed system must still end up in the feeding trays.

AKVA group also offers tailor made land based tank solutions with optimal recirculation (RAS).

A well proven Akvasmart CCS Feed System concept: Selector Valve + Feed Doser Valves on each silo + Air Cooler + Air Blower.

The CCS feed selectors can be tailor made for all types of locations, and have a max feeding rate for each feed line of 192kg/min.

Example shrimp farm layout with central feed silos, 550m 90mm HDPE feed pipes into 80-100m ponds. Note the counter rotating currents moving the feed towards the access ramp with feed tray in each pond.

A well proven Akvasmart CCS Feed System concept: Selector Valve + Feed Doser Valves on each silo + Air Cooler + Air Blower.

The CCS feed selectors can be tailor made for all types of locations, and have a max feeding rate for each feed line of 192kg/min.
A perfect live feed solution in small bottles

Algae Bioreactor
After years of research and using different culturing methods for micro algae, we have developed a complete automatic algae bioreactor. We produce algae continuously to ensure a stable high quality production of algae as food for the copepods. This is the first step for a healthy production of a high quality copepod product, since a copepod is what it eats.

Monitoring and control
The backbone of our production is based on AKVAconnect that controls and monitors all processes in the system. A unique AKVAconnect PLC module is developed specifically for algae and copepod production. Automation of the production processes thereby decrease product prices for our customers.

Why should I buy Acartia?
Copepods are the booster of marine aquaculture. They are the natural food source for marine fish larvae. In the last 3 decades, the aquaculture sector has dreamed about copepods. Now the dream come true. AKVA group has upscaled production of copepods under the brand Acartia.

We grow money for you
Rearing copepods is notoriously difficult. Therefore we do all the hard work producing and growing copepods. Then we harvest, disinfect and store the eggs that can easily be used at your marine fish hatchery. Allows you to focus on what you do best – production of fish. Optimizing your fish production and increasing your profitability.

Acartia are the natural food of fish larvae. Now copepods can be produced on an industrial scale. Fish farmers worldwide will be able to increase their production of marine fish larvae.
Industrial Copepod Farming will change Global Marine Aquaculture

This is what you do - it’s safe and easy

Feeding with Acartia is a very quick and simple process. After receiving your Acartia product from AKVA group, you have two easy choices.

1. Store the Acartia eggs for later usage by keeping them dark and refrigerated at 4°C. Acartia can be cold-stored safely until the expiry date stated on the product.

2. Hatch your Acartia straight away and use them as live feed for your fish.

Copepods versus Rotifers

Acartia will enhance the survival of fish larvae when compared to fish larvae fed with rotifers. Replacing rotifers with copepods is money in the pocket!

Copepods as co-feeding

Copepods in combination with rotifers will improve the growth of your fish larvae. Co-feeding with copepods will improve your success. Replacing 25% of your rotifers with copepods will significantly improve the growth of your fish larvae.

Copepods - nature’s choice for marine fish species

Below you will find some of the most common aquaculture species that prefer copepods:

The copepod project has been funded by Innovation Fund Denmark and developed in close cooperation with Roskilde University, AgroTech and Aqua Circle.
Camera and Sensor Systems

Full overview and complete control with AKVAconnect

Akvasmart’s advanced video camera and sensor systems monitor both the fish and the feeding process. This ensures optimum operations and a healthy environment for the fish.

Flexible camera solutions, like monochrome feeding cameras or winch controlled pan & tilt 360° Twin colour cameras, provides crystal clear pictures. Wireless transmission of surface and underwater video images, feeding- and environmental data to the farm base.
Crystal clear and simple first choice

Basic HR Camera
The Basic HR Camera is simple, reliable and affordable monochrome camera and a smart choice if you need many cameras.

Akvasmart HR models are the world’s most popular camera series. The HR cameras can be operated from the tank, feeding control room or via the Internet. One camera is usually permanently installed in each tank or pond.

Akvasmart’s video camera and sensor systems monitor both the fish and the feeding process.

You can view and remote control our video cameras from android, IPAD or PC via internet.

Cameras, cables and connection plugs are pressure tested down to 40 metres to ensure that the equipment is 100% pressure proof.

Flexible and affordable camera solutions for tanks and ponds.

Robust and waterproof connection cables.

The HR models are the world’s most popular camera series.

SmartEye Double Camera - In-water colour camera with the ability to switch between look up and look down camera via AKVAconnect process view.

Cameras, cables and connection plugs are pressure tested down to 40 metres to ensure that the equipment is 100% pressure proof.
Top of the line - feeding and inspection cameras

**Basic HR Feeding Camera** - The Akvasmart HR cameras are the world's most popular feeding camera series. These are stationary cameras hanging below the fish eating area (typically 5-8m) aiming straight up to detect uneaten pellets sinking towards the camera. Basic HR is a simple, reliable and affordable monochrome camera and a smart choice if you need effective feeding control in cage. Recommended use: Tanks and smaller cages.

**Super HR Feeding Camera** - All of our HR-cameras can be used with Akvasmart hardwired or wireless camera systems and can be operated from the cage, a workboat, feeding control room or via the Internet. One camera is usually permanently installed in each cage. The Super HR Feeding Camera is a rugged and reliable high-resolution monochrome camera designed for use under all conditions. Recommended use: Tanks, medium and smaller cages.

**SmartEye Double Camera** - In-water camera with the ability to switch between look up and look down camera via AKVAconnect process view. This requires WiFi or Fibre based system. Switching between look up and look down is performed using the I/O on the Axis Video server in conjunction with small switch board. Can also be used with a Digital CAP. Recommended use: Tanks, medium and smaller cages.

**SmartEye 360 Twin** - Smart Eye 360 Twin ULL version is the best possible camera for darker light conditions. It has two monochrome cameras that are very light sensitive, and they deliver excellent video images when looking down into deep and dark cages. ULL = Ultra-low light. Smart Eye 360 Twin Colour/ULL camera configuration includes a high resolution colour camera pointing up, and a ULL monochrome camera pointing down. Smart Eye 360 Twin Colour is an advanced double feeding and inspection colour camera with unique features.

The Smart Eye 360 Twin camera is delivered in three different versions, they are all delivered without external moving parts, and thus a massive reduced risk of leaks. All SmartEye 360 Twin cameras include two cameras, one pointing down towards the bottom of the cage, and one that is pointing upwards. Both cameras are synchronized for 360 degrees movement with one joystick for full overview. These cameras are installed in the cage and are operated from a work boat, the feeding control room and via the internet. It provides sharp underwater video images. SmartEye 360 Twin cameras are also available with built-in depth- and temperature sensor. Recommended use: Medium and large cages.

---

**Camera Specifications**

<table>
<thead>
<tr>
<th>Cameras</th>
<th>SmartEye 360 Twin ULL</th>
<th>360 Twin VVK ULL</th>
<th>360 Twin 2 color</th>
<th>Double Camera</th>
<th>Super HR</th>
<th>Basic HR</th>
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</thead>
<tbody>
<tr>
<td>Colour/Up/down</td>
<td>Monochrome</td>
<td>Colour/mono</td>
<td>Colour/mono</td>
<td>Colour</td>
<td>Monochrome</td>
<td>Monochrome</td>
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<td>Fix: 72°</td>
<td>Fix: 72°</td>
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<td>75m (246') PUR</td>
<td>75m (246') PUR</td>
<td>35 to 100m</td>
<td>50 to 100m</td>
<td>50 to 100m</td>
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<tr>
<td></td>
<td>75m (246') PUR</td>
<td>75m (246') PUR</td>
<td>75m (246') PUR</td>
<td>(99-328') PUR</td>
<td>(99-328') PUR</td>
<td>(99-328') PUR</td>
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<tr>
<td>Depth rating</td>
<td>75m (246') PUR</td>
<td>75m (246') PUR</td>
<td>75m (246') PUR</td>
<td>100m (323')*</td>
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<td>12V DC</td>
<td>12V DC</td>
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<td>12V DC</td>
</tr>
</tbody>
</table>

* Limited by cable

---

**Surveillance Cameras - Complete overview of your barges and sites**

SmartHawk Surveillance cameras provide better control over unwanted visitors, predators, feed spread or simply added safety when working alone at the farm. These are advanced IP cameras with powerful 32x optical zoom, clear pictures and smart functionality, which can easily be operated from the cage, workboat, control room or via Internet.

SmartHawk Surveillance cameras can monitor the recirculation, feeding system or other vital areas on the location.

The Surveillance cameras have full color but they will switch to monochrome under low light conditions.

- **Detects predators and unwanted visitors**
- **increase safety and overview**

---

**Surveillance Camera**

- **Colour:**
  - Colour
  - Monochrome
- **Resolution:**
  - Day: 720x478 to 178x144 (50 Hz)
  - Day: 720x480 to 178x120 (50 Hz)
  - HD: 720p
- **Angle of view:**
  - Horizontal: 47.0°-1.5°/Vertical: 35.5°-1.1°/Fix: 44 dig. zoom
  - > 100m
  - > 100m
- **Ingress Protection:**
  - IP66
  - Outdoor IP 66
  - Outdoor IP 54
- **Power:**
  - PoE (Ethernet)
  - PoE (Ethernet)
Environmental sensors are a smart investment that will ensure efficient feeding.

Environmental data - a critical feeding parameter

Full control of the environmental data will ensure correct farming decisions.

Environmental sensors combined with AKVAconnect will monitor and control secure the stability in your system.

Feed accounts for 60-90% of the production cost in most fish farming today. That makes every pellet count when it comes to financial results.

To know the environmental data such as temperature, oxygen, salinity, pH and current speed and direction is important when feeding fish. Akvasmart Feeding Software allows full control of the environmental status on the site, at all times. The data can be viewed real-time or logged for later analysis. The Akvasmart software can also be set to automatically control the feeding based on these parameters.

Oxygen data - an important factor for growth and fish welfare.

A compact Multi Sensor with 6 different functions and 12 parameters including temperature and oxygen control.

Dedicated environmental sensors will provide accurate level data of oxygen, pH ammonia, nitrogen and salinity.

Temperature - the foundation for all feeding regimes and growth models.
Environmental, water level and conductivity sensors

Temperature - the foundation for feeding and growth models

There are two different temperature sensors: a separate sensor/stand-alone sensor for connecting to AKVAconnect or integrated in the optical oxygen sensor for using in AKVAconnect.

Oxygen – an important factor for growth and fish welfare

The oxygen sensors are with optical reading which reduces the need of calibration and maintains high accuracy and operates with no drift over long-term deployments. On the Oxygen RDO all this information is stored in the replaceable CAP tip. The optical sensors have a fast response and maintains stability, even in dynamically changing conditions.

Full environmental overview - know your site

Measure and record water pressure, conductivity, and temperature with the Aqua TROLL 200, or conductivity and temperature with the Aqua TROLL 100. Unique conductivity cell allows for a wide, accurate measurement range in a narrow diameter instrument.

The new Multi Sensor is a compact instrument that houses six water quality sensors and measures 12 parameters: • Actual and specific conductivity, salinity, total dissolved solids, resistivity, and density • Dissolved oxygen • pH • Temperature • Water level and water pressure (absolute).

<table>
<thead>
<tr>
<th>Temperature Sensor</th>
<th>Separate Inside</th>
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</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>+/- 0.1°C</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>+/- 0.1°C typical</td>
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<tr>
<td>Operating temp.:</td>
<td>0-50°C / 32-122°F</td>
</tr>
<tr>
<td>Depth rating:</td>
<td>10m ft. by cable 210m ft. by cable</td>
</tr>
<tr>
<td>Housing:</td>
<td>Bronze Polyethen</td>
</tr>
<tr>
<td>Cable:</td>
<td>30m unthane 30m unthane</td>
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</table>

<table>
<thead>
<tr>
<th>Oxygen Sensors</th>
<th>RDO Standard</th>
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<tbody>
<tr>
<td>Accuracy:</td>
<td>+/- 0.1mg/L 0-8mg/L</td>
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<tr>
<td>Operating temp.:</td>
<td>0-50°C / 32-122°F</td>
</tr>
<tr>
<td>Depth rating:</td>
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<tr>
<td>Housing:</td>
<td>Polyethen Polyethen</td>
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<tr>
<td>Cable:</td>
<td>10 or 50m 10 or 50m</td>
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</table>

<table>
<thead>
<tr>
<th>Multi Sensors</th>
<th>Troll 100 Troll 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported parameter:</td>
<td>Actual conductivity, specific conductivity, and temperature Actual conductivity, specific conductivity, temperature, water level/depth/pressure</td>
</tr>
<tr>
<td>Conductivity:</td>
<td>+/- 0.5% +1μS/cm typical +/- 1% max range</td>
</tr>
<tr>
<td>Temperature:</td>
<td>+/- 0.5°C</td>
</tr>
<tr>
<td>Housing:</td>
<td>Titanium body and sensors, Delrin nose cone, and PVC conductivity cell</td>
</tr>
</tbody>
</table>

Infrastructure for cameras and sensors

Digital CAP UK - hardwired infrastructure for cameras and sensors

A connection point for all our underwater cameras and three environmental sensors. With transmission of up to 6 parallel video channels the system suits all types of farm sites. The Digital CAP UK is offered in two versions, a standard hardwired model and a new customized version with an Entry Level Wi-Box for the Mediterranean marked.

Hard wired solutions - when simple stability counts

Infrastructure that fulfills your need for fixed solutions. Adapted and customized for each site – various sensors and cameras can be adapted to the system.

EAP - hard wired and wireless solutions for environmental data

The EAP is directly linked to the Akvasmart CCS Feed System via the AKVAconnect software. Collecting and logging environmental data from one or multiple depths provides better control of the feeding.

Network for water quality and environmental data

All data can be viewed, recorded and logged within the AKVA connect software package, allowing parameter thresholds to be set and highlighted. The Akvamart Environmental Sensor System is designed as a stand-alone system.

Environmental Sensor System

Range: +800m
Frequency: 868MHz (EU license free band)
Battery Size: 24Ah (if required)
Power supply: 115v-230v Single Phase 12v model available on request
No. of Communications Hub per base: 50+
Sensors per Communications Hub: 3
Battery Life: Minimum 24hours **
Mount Bracket: Galvanised Steel/Stainless Steel
Sensor Cases: Yellow

Digital CAP UK - wired hardwired sensor system

- Temperature
- Conductivity
- Dissolved oxygen
- pH
- Pressure
- Water level
- Depth

Temperature Sensor

- Operating temp.: 0-50°C / 32-122°F
- Depth rating: 10 or 50m
- Housing: Bronze Polyethen
- Accuracy: +/- 0.5°C typical
- Cable: 30m unthane 30m unthane

Oxygen Sensors

- Operating temp.: 0-50°C / 32-122°F
- Depth rating: 210m ft. by cable 300m ft. by cable
- Housing: Polyethen Polyethen
- Accuracy: +/- 0.1mg/L 0-8mg/L
- Cable: 10 or 50m 10 or 50m

Multi Sensors

- Supported parameter: Actual conductivity, specific conductivity, and temperature Actual conductivity, specific conductivity, temperature, water level/depth/pressure
- Conductivity: +/- 0.5% +1μS/cm typical +/- 1% max range
- Temperature: +/- 0.5°C
- Housing: Titanium body and sensors, Delrin nose cone, and PVC conductivity cell
- Cable: 30m unthane 30m unthane

Multi Sensor Troll 400

- Supported parameter: Actual conductivity, specific conductivity, dissolved oxygen, pH, ORP, temperature, water level/depth/pressure (absolute)
- Oxygen: +/- 0.1mg/L 0-8mg/L +/- 0.2mg/L 8-20mg/L +/- 0.10% 20-50mg/L
- Conductivity: +/- 0.5% +1μS/cm typical +/- 1% max range
- ORP: +/- 0.5mV
- pH: +/- 0.1 pH unit
- Temperature: +/- 0.5°C
- Housing: PVC, acetal, titanium, 316 stainless steel

Digital CAP

- Temperature Sensor
- Conductivity Sensor
- Dissolved Oxygen Sensor
- pH Sensor
- Pressure Sensor
- Water Level Sensor

Environmental Sensor System

- Range: +800m
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- Battery Size: 24Ah (if required)
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- Sensor Cases: Yellow

Digital CAP UK

- Temperature Sensor
- Conductivity Sensor
- Dissolved Oxygen Sensor
- pH Sensor
- Pressure Sensor
- Water Level Sensor

Environmental Sensor System

- Range: +800m
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- Battery Life: Minimum 24hours **
- Mount Bracket: Galvanised Steel/Stainless Steel
- Sensor Cases: Yellow
Stable and accurate lighting increases profits

The correct use of underwater lights for many aquaculture species ensures reduced fish maturation. In addition, it results in faster growth and more effective feed utilization. The Idema Underwater Lights series are adapted for smolt and juveniles in small tanks, as well as for salmon, cod, and other fast-growing species that require light in larger farms. The high-quality underwater lights have excellent light distribution, which allows for easy bulb replacement, functional design, and a rugged construction. The power is connected to the underwater light through a standard IP67 plug, enabling simple installation. The standard cable length are 35 or 55 meters. Idema Underwater Lights are the ideal tools to help improve yield and profits.

- Quality is always profitable!
High quality underwater lights

LED-lights and metal halogen lights

Idema BlueLite 1000W

Expected service life on the LED bulbs is in the region of 50,000 hours.

ISO approved Pyro Borosilicate glass to withstand rough use in cage farming operations.

Standard 35m or 55m rugged underwater cable (Letherlon cable), and a waterproof connection plug.

An extra strong construction that is almost maintenance free.

Idema BlueLite 1000W

Faster growth with stable and accurate lighting!

BlueLED 400W is a perfect light solution for cage farms with medium or large cages.

Light treatment is also successfully used for small and juveniles in tanks and cages of different types and sizes.

Accurate even light distribution throughout the biomass is vital in tanks with high density and humus loaded water.

Underwater Lights can easily be installed in most sites, ensuring stable and accurate light distribution.

More than 16,000 Underwater Lights have been delivered worldwide in the last 15 years.

We base our CE- marking on tests run by Nemko according to the EMC and LVD directives.

For indoor locations we recommend 100W to 400W illumination. BlueLED or SubLite 250W/400W is the smart choice here.

Light treatment is also successfully used for small and juveniles in tanks and cages of different types and sizes.

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Underwater Lights can easily be installed in most sites, ensuring stable and accurate light distribution.

- Faster growth with stable and accurate lighting!

We base our CE- marking on tests run by Nemko according to the EMC and LVD directives.
Aurora SubLED Combi 1350W, a new and unique combination of anti-maturation light and UV-light will keep the fish in deeper waters. The underwater lights are placed on approximately 10 meter depth and can then cover the whole cage. This will reduce the louse infestation and the effect will be reinforced if the light system can be combined with underwater feeding at the same depth. Recommended use: Medium and large cages.

BlueLED 400W with blue light rays is a rugged luminaire for the sea cages. This luminaire is utilizing the newest High Intensity LED-technology with almost four times more effective light source than the BlueLED 100W. The blue colour has proven to have a very good effect on the fish biology. LED luminaires can provide more effective output from each luminaire compared to other lamp technologies. It saves cost on power generators, less power use compared to halogen lamps and uses less copper in the installations. All this in addition to the long service life of the luminaire.

Aurora SubLED 100W, an adjustable underwater light for land based sites. In a standard version the light turns gradually on, but in a more advanced setting, the light in each tank can be controlled off and on after a predetermined program. This will reduce stress for the fish and ensure optimal smoltification. The light system has several benefits and it will not bring the fish up to the surface. Recommended use: Landbased tanks and smaller cages.

SubLite Integra 250W/400W is the smallest member of the SubLite family. The light can be offered in two luminosities for smolt, juvenile and smaller locations. This model is often placed at various depths for a smooth distribution of light all over the cage. The light bulb and the electronic control device is integrated in the housing compartment and has a service time in the region of 5.000 hours. Recommended use: Tanks, smaller and medium cages.

SubLite Integra 1000W is placed at various depths and the powerful light ensures an excellent spread. The light bulb and the electronic control device is integrated in the housing and is easy to install. This unit also has a service life in the region of 5.000 hours. Recommended use: Medium and large cages.

Underwater Lights Specifications

<table>
<thead>
<tr>
<th>Specifications:</th>
<th>Aurora SubLED 1350W</th>
<th>BlueLED 400W</th>
<th>Aurora SubLED 100W</th>
<th>Integra 250/400W</th>
<th>Integra 1350W</th>
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<tbody>
<tr>
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<td>48 VDC</td>
<td>230 VAC 50Hz (60DC)</td>
<td>230 VAC/50Hz (24DC)</td>
<td>230 VAC 50Hz</td>
<td>230 VAC 50Hz</td>
</tr>
<tr>
<td>Starting current 0.5 second:</td>
<td>6.6A (1500W)</td>
<td>1.8A (400W)</td>
<td>1.0A (1200W)</td>
<td>2.45A (500W) / 3.0A (800W)</td>
<td>0.0A (1840W)</td>
</tr>
<tr>
<td>Starting current 1 second:</td>
<td>6.6A (1500W)</td>
<td>1.8A (400W)</td>
<td>2.5A (1150W)</td>
<td>1.9A (407W) / 2.6A (480W)</td>
<td>6.6A (1470W)</td>
</tr>
<tr>
<td>Operating current 2 min.:</td>
<td>0.5A (1350W)</td>
<td>2.15A (4800W)</td>
<td>0.5A (1800W)</td>
<td>1.2A (250W) / 1.8A (400W)</td>
<td>5A (1130W)</td>
</tr>
<tr>
<td>Total efficiency:</td>
<td>1350W</td>
<td>4800W</td>
<td>1150W</td>
<td>275W / 460W</td>
<td>1800W</td>
</tr>
<tr>
<td>Expected lifetime:</td>
<td>approx. 50 000 hours</td>
<td>approx. 70 000 hours</td>
<td>approx. 50 000 hours</td>
<td>approx. 30 000 hours</td>
<td>approx. 50 000 hours</td>
</tr>
<tr>
<td>Light source:</td>
<td>288 LED diodes / 32 UV diodes</td>
<td>184 LED</td>
<td>42 LED</td>
<td>HQT 2500 / HQT 4000</td>
<td>HQT 13000</td>
</tr>
<tr>
<td>Color temperature (Kelvin):</td>
<td>3000 K warm white</td>
<td>20000 K (480 nm Blue)</td>
<td>3000 K warm white</td>
<td>53000 K / 6100K</td>
<td>8000K</td>
</tr>
<tr>
<td>Luminosity:</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20 000 lm / 35 000 lm</td>
<td>85 000 lm</td>
</tr>
<tr>
<td>Weight, light housing:</td>
<td>6kg</td>
<td>11kg</td>
<td>8.5kg</td>
<td>7kg / 10kg</td>
<td>21.6kg</td>
</tr>
<tr>
<td>Size, length + Ø:</td>
<td>542mm + 160mm</td>
<td>641mm + 120mm</td>
<td>641mm + 120mm</td>
<td>544mm + 140mm</td>
<td>818mm + 160mm</td>
</tr>
<tr>
<td>Material in the main housing:</td>
<td>PES 1.41g/cm³</td>
<td>Aluminum B2B TS 2.5g/cm³</td>
<td>PES 1.41g/cm³</td>
<td>DIN 53479 - L15</td>
<td>DIN 53479 - L15</td>
</tr>
<tr>
<td>Lens material:</td>
<td>Acrylic</td>
<td>Borosilicate glass</td>
<td>Borosilicate glass</td>
<td>Borosilicate glass</td>
<td>Borosilicate glass</td>
</tr>
<tr>
<td>Cable, standard length:</td>
<td>PUR 301.5 35 or 55 m</td>
<td>Rub 301.5 30m or 55m</td>
<td>PUR 301.5 35m or 55m</td>
<td>PUR 301.5 35m or 55m</td>
<td>PUR 301.5 35m or 55m</td>
</tr>
<tr>
<td>Cooling fluid:</td>
<td>Water (convection)</td>
<td>Silicon oil</td>
<td>Silicon oil</td>
<td>Water (convection)</td>
<td>Water (convection)</td>
</tr>
<tr>
<td>Recommended use:</td>
<td>Medium &amp; large cages</td>
<td>Medium &amp; large cages</td>
<td>Tanka / medium cages</td>
<td>Tanks / medium cages</td>
<td>Medium &amp; large cages</td>
</tr>
</tbody>
</table>

Note: Specifications are subject to change without prior notice.

Easy user interface allows you to set up your personal light regime in AKVAconnect. You can turn on or turn off the lights for a fixed time. You can regulate the light intensity in each cage depending of the density of the fish and where you are in the production process. Our professional AKVA group staff can help you with the initial set up.

By using extra light on i.e. salmon, you will achieve faster growth and get higher harvest weight as opposed to not using underwater lights.

AKVA group offer a regular service visit with equipment control and maintenance, including a detailed status report.

A wide range of smart camera and sensor solutions provide full overview and control of the biomass.
Intelligent IT solutions

AKVAconnect and Fishtalk are unique tools that integrate fish farming operations. This ensures optimum efficiency, excellent fish quality and increased profitability. The software covers all needs for process control, production control and planning.

Fishtalk: This software covers most aspects of the biological production control and planning, as well as production costing and budgeting. Reports and analysis are the basis for decisions, both long term and short term, and provides historical overview, status and prognosis.

AKVAconnect: A software platform that is designed for optimal control of the processes and activities on fish farms. The system offers full control, surveillance and integration of machines, sensors and all processes on both sea and land based fish farms.
Complete Value Chain Control

**Fishtalk Control**
Plan and finance, biology plan, finance - budgetting, economy control, production cost etc. Fishtalk Control captures data from broodstock to harvest and has powerful reporting and analysis capabilities. With the financial and planning modules Fishtalk becomes a primary tool, from day to day use on a single site to mapping out a 5-year plan for the whole company.

**AKVAconnect**
AKVAconnect is a powerful "SCADA" process control platform used to connect and control a wide range of equipment and technical processes at the farm. The system is open ended and compatible with all types of equipment, sensors and technical installations. Smart 3D design with interactive control functions, makes it incredibly easy to operate.

**Fishtalk Equipment**
The Fishtalk Equipment software organizes all the farming equipment with documentation and maintenance, maintaining full traceability on component level. Comply with the Norwegian NS9415:2009 and NYTEK.

**From broodstock to harvest**
- Broodstock
- Hatchery
- Juvenile
- On-growing
- Harvesting

**Process control platform**
- Current control
- Oxygen control
- Temperature control
- Camera control
- Alarm system
- Underwater Lights
- Feed control
- Salinity
- Water quality
- pH values

**Full equipment control**
- Organizing
- Certification
- Documentation
- Spare parts
- Emergency Measures

AKVA Cloud solution provides simple access. The user can work off-line and all data will be visible on-line. Supports LTE/4G and Wi-Fi.
Fishtalk Control - From Broodstock to Harvest

The Fishtalk-family

Fishtalk Control is developed with several modules, where the modules are the same system and don’t require configuration of integrations. This provides benefits in terms of less risk of errors and reduced costs for setup, and one user interface to deal with.

In order to maintain as much control as possible and comprehensive management, we recommend expanding with Planning and Finance. This means all management data are in the same database that contains common functionality, and decisions may be made based on biology and economy. Biology and economy, historical, real-time and future are dimensions that walk hand in hand in Fishtalk. The reporting and analysis tools show the effect of all the areas in the same solution.

One of our newest modules is Fishtalk Optimizer, which allows users of Fishtalk Plan to optimize plans using optimization technology. Fishtalk Plan uses simulation to produce the biological plan, while Fishtalk Optimizer uses optimization techniques to identify the best plan.

Fishtalk Optimizer takes a plan and applies mathematical optimization to create the best possible slaughter plan based on a given set of restrictions. With Fishtalk Optimizer, planners will save time on planning and have the best slaughter plan calculated in a matter of seconds.

AKVA cloud is a project to ensure better interaction between AKVA group’s software solutions, while also facilitating communication with other developers of different types of software. We aim to make everyday life easier for our customers, and quite specifically this can entail that the fish farmer avoids having to punch data from the feed systems into Fishtalk, or that data from equipment inspections is registered in an app.

Fishtalk Control

Fishtalk Control software provides producers complete control of the production from broodstock to harvest. Used by single sites as well as large corporations, Fishtalk is the most complete production control software in the market.

Fishtalk Plan

Fishtalk Plan is a user friendly tool for production planning. Yet it includes advanced features such as rolling forecasts, scenarios and flexible plan structures, making it a more powerful tool. The flexible reporting system helps you take operational decisions by comparing different scenarios efficiently.

Fishtalk Finance

Production cost calculation is easy with Fishtalk Finance. A minimum of setup is required, and you will be up and running in no time. Simply import data from accounting once a month and you will easily obtain new insight into your cost of production.

Fishtalk Finance

Budgeting using Fishtalk Finance is simpler than ever. Just define your cost models and any production plan can be used to generate the major cost factors like feed, transport and harvest. Comparing budgets generated from different scenarios quickly gives you the financial impact of your decisions.

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Fishtalk Equipment

Good operation of equipment is measured in biology – good biology results in good economy. Fishtalk Equipment is a good platform for improved operations and better control. Fishtalk Equipment is the solution for operation, maintenance and documentation, and can comprise all equipment at a location.

Tailored work processes for preventive maintenance. Plan, and receive notifications when the deadlines approach. Perform inspections with checklists for complete control of documentation.

Fishtalk has been developed in close cooperation with the industry to meet challenges in industrial fish farming.

Organizes all the farming equipment with documentation and maintenance, maintaining full traceability.

AKVA Cloud solution provides simple access. The user can work off-line and all data will be visible on-line. Supports LTE/4G and Wi-Fi.

Recertification
Plans operation of equipment in relation to production cycle and time for next recertification. Plans notifications for the right time and to the right people. Documentation of recertification.

Emergency measures
Map and table provides an overview of damaged parts and equipment. Provides all information in order to consider appropriate measures. Easily accessible information on strength/properties when parts need to be replaced quickly.

- Assignment of tasks to user
- Help to user for performing tasks
- Direct input when job is being done
- Offline solution

Traceability with full history and access to all documentation, certificates and relevant user guides.
Meets all requirements pursuant to NS 9415:2009 and NYTEK.

Biological planning
Operation of equipment must be adjusted to biological requirements. Good overview of status provides good basis to operate equipment based on biological plans. The right equipment in relation to wave height, current conditions, etc., and enough equipment available to satisfy needs.

Audits
Documentation on operations and maintenance is always available. Information by component/equipment part, or at the level desired. Status of use and maintenance history. Overview of planned maintenance.

A graphical map view linked to list view makes it easy to maintain control of work orders for organizing activities, reports, overviews and document records.

Fishtalk Equipment provides control and overview down to the smallest parts.

- Planning
- Preventive measures
- Quality
- Operations status
- Documentation
- Recertification
- Status of operations
- Status of maintenance
- Notification
- Work orders
- Certificates
- User guides

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AKVA Cloud solution provides simple access. The user can work off-line and all data will be visible on-line. Supports LTE/4G and Wi-Fi.
Fishtalk family – Flexible software for all fishfarmers

Plan
Fishtalk Plan provides optimal production plans according to your strategies. This gives you a unique basis for making qualified operational decisions based on various scenarios for each species.

Finance
Fishtalk Finance enables simulation of the financial effects of the planned activities. The solution provides in-depth information according to the biological plans, budgets and forecasts, - all based on a set of different scenarios.

Optimizer
Fishtalk Optimizer uses matematic optimization to create an optimal slaughtering plan including an acertained set of limitations. Planners will be able to save time and calculate the best plan in seconds, using Fishtalk Optimizer.

Benchmarking
Fishtalk Benchmarking provides fast and simple rankings compared to established production goals, such as growth rates, feed conversion rates, hit rates and other KPIs as VF3 and SGR.

Broodstock
Fishtalk Broodstock seamlessly integrates broodstock and production control, and provides full traceability to genetic origin and across generations of broodstock. It captures group level information as well as data for individual fish, like genetic markers and quality samples.

Cleanerfish
Cleanerfish ensures a full updated overview of the treatment. The module extends the lice module in Fishtalk and provides an unique tool for monitoring and analysing.

Lice
Fishtalk Lice shows lice developments and effect of treatments for each cage or region. Fishtalk Cleanerfish provides stacking numbers for each cage and percentage of Wrasse vs. salmon.

Environmental Monitoring
Module for managing documents from environmental surveys. Enter results and documents from environmental surveys in Fishtalk. You can easily search, add or revise documents in a document archive.

Equipment Service Planner
Efficient registration of data at the cage. Achieve better data flow, sharing and reporting. Get rid of the notepads and binders, and let our apps simplify collection of data from production. We supply both standard apps and customized solutions.

WebClient and Apps
Efficient registration of data at the cage. Achieve better data flow, sharing and reporting. Get rid of the notepads and binders, and let our apps simplify collection of data from production. We supply both standard apps and customized solutions.

Tide
Fishtalk Tide provides predicted hourly tide levels and change in tide level. This makes it easy to plan operations that depends on slack tide and low currents, like net change and lice treatments.

Consulting
Vi have an expericed consultancy department with dedicated focus on biologi and technology which will contribute to optimal results. From Fishtalk startup to customized courses and consulting, process improvement or tailormade software solutions.

For more information, contact: supportfishtalk@akvagroup.com - telephone: +47 73 84 28 89
AKVAconnect is a new process control platform used to connect to and keep control on everything from local farm sites to large international aquaculture corporations. The system is open ended and compatible with all types of equipment, sensors and technical installations. Smart 3D design with interactive control functions, makes it incredibly easy to operate.

AKVAconnect software

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AKVAconnect is a powerful and advanced software for daily control of all your feeding processes. Combined with Akvasmart CCS Feed System, it is the most adaptable and user friendly system on the market.

Site Control

Site surveillance provides detailed information and status reports from multiple sites in real-time and is a very useful tool when you centralize the operations. AKVAconnect alarm system supports full traceability.

Light Control

Large screens provides full overview and control the underwater lights in using AKVAconnect software. The lights can also be easily operated with remote control, using AKVA group’s digital network.

Feeding Control

All devices can be monitored and controlled. Information about the present state, running hours and maintenance is conveniently monitored.

Process Control

Monitor and control all parameters in your production environment to secure maximum stability in your system. Temperature, oxygen, salinity, pH etc.

Environmental Control

Both analog and digital cameras are integrated in the system, and are fully controllable from any site or position. Multiple scalable camera windows can be shown and controlled directly on screen and monitored via internet.

Camera Control

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Exciting, innovative solutions

AkvA group offers a wide range of cage farming aquaculture technology, from single components to complete installations worldwide.

We have developed a reputation for quality products and software that provide maximum reliability and cost effectiveness. Large numbers of cages, boats, net cleaners, feed barges, feed systems, sensors, cameras, underwater lights and software are currently in use on a wide variety of farms.

The equipment is operating year-round under diverse wave and wind conditions, in more than twelve regions of the world. This is a strong testimony of the reliability of the designs.
Cage Farming Aquaculture - Complete Solutions Worldwide

Feed Barges
AKVA group is the world’s leading supplier of feed barges with decades of experience and nearly 300 barges delivered worldwide.

Feed Systems
The central feed system was invented by AKVA group in 1980 and Akvamart CCS is today the world’s most popular and reliable feed system.

Cages
AKVA group is the leading supplier of both plastic and steel cages in aquaculture, and has since 1974 delivered more than 60,000 cages.

Software Solutions
Fishtalk is a unique IT concept and tool that provides integrated operations and biological production. AKVAconnect is the latest farm operations and technical control software platform.

Camera and Sensor Systems
Advanced video camera and sensor systems monitor both fish, the feeding process and the environment. This ensures optimum operations and a healthy fish.

Workboats
The robust Polarcirkel workboats offers great design, quality build, unique flexibility, safety and low maintenance.

PRODUCTS

Underwater Lights
Camera Systems
Environment Sensors
Net Cleaning
Nets
Plastic Cages
Steel Cages
Mooring Systems
Feed Barges
Service
Work Boats
Feed Systems
Software
Workboats
Wavemaster Feed Barges

The main purpose for a feed barge is to provide the most efficient and reliable feed system for your farming operations. The second purpose is to provide a safe and seaworthy barge that can withstand the forces of nature at your farmbase site.

Each individual barge model has been optimized to ensure the lowest possible cost compared to size of barge. As a result, the AKVA group Feed Barges are the most cost efficient barges on the market with no material or space wasted.

Flexible crane solutions
Cranes of high quality and different sizes can easily be installed on the barges.

Automatic silo hatches
They will open safely and easily with a new electrical remote system. New silo loading system means only 4 hatches are opened to load 16 silos, thereby shortening loading time.

“Trumpet” mooring pipes
Reinforced bottom “Trumpet” mooring pipes distributes loads and prevents chain being snagged during tightening.

Watertight bulkheads
Subject to local safety regulations, most barges include 3-5 watertight bulkheads with two automatic bilge pumps in each.

Steel plate thicknesses
of 5.5 - 6.5mm.

Large silo capacity
The feed storage capacity in each silo range from 15-64 metric tons (based on a density of salmon feed at 650kg/m3).

Gentle feed handling
Custom designed feed doser valves transfer the feed into the air flow. Air control ensures gentle feed handling.

Integrated tanks
Most barges are supplied with large fuel tank(s), freshwater tank, hot water tank, sewer tank and optional integrated mort storage tank(s).

Just like home
Modern feed barges today are becoming a main work place with proper facilities, living areas and entertainment centers.

Sound proof machine room
A big machine room with sound proofing makes the maintenance easier and leaves room for more equipment.

Integrated tanks
Our new AB 450 and 650 barges are designed with larger deck space and more working area.

Reliable feed system
The central feed system concept was invented by AKVA group in 1980 and CCS is today the most popular and reliable system world wide.

Large deck space?
Our new AB 450 and 650 barges are designed with larger deck space and more working area.

Full overview and control
The control room is the heart of the feed barge. This is where the operator has all the information available and controls the entire feeding process.

Optimal Air Control
Air control system allows for real time measurement of airflow, back-pressure and temperature ensuring optimum feed handling.

“Trumpet” mooring pipes
Reinforced bottom “Trumpet” mooring pipes distributes loads and prevents chain being snagged during tightening.

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Akvasmart CCS Feed System

The Feed System
The Akvasmart CCS Feed System is designed to handle more than 40 feed lines running in parallel and more than 1000 cage/tank units, centralized- or hopper feeders, all operated from one PC, iPad or smartphone.

Akvasmart CCS is the perfect choice for feeding fish, designed to fit the requirements from low capacity system such as CCS-32, up to high capacity systems such as CCS-110.

Software
Generates transport air for the feed system.

Feed Blower
Regulated air speed and keeping the pellet in the gentle feed handling area significantly reduce the risk of blockage and feed breakage.

Air Cooler
Reduces the temperature of the transport air above or below the surface.

Cleaning Plug Injector
The Cleaning Sponge is inserted into the feed system via the Feed Pipe Cleaner, and will be transported through the system by using pressured air. The sponge will attract feed residues and condense when going through, reducing deposits inside the pipes to a minimum.

Feed Silos
Up to 8 silos can be connected in series for each feed line.

Feed Doses
With capacities from 0.6kg/min up to 192kg/min. Up to 8 dosers can be connected in series for each feed line.

Feed Selector Valve
Distributes feed to the correct cage and ensures gentle feed handling. The Selector Valves can be offered with connections from 4 to 60 feeding pipes.

Integrated accessories
A wide range of Akvasmart units such as sensors, cameras, and rotor spreaders can easily be integrated to the CCS Feed System.

Feed Pipes
A wide range of high quality and durable Polarcirkel Feed Pipes are available in various dimensions and coil lengths up to 1000 metres.

Environmental Sensors
Camera
Network Systems
Underwater Lights
Rotor Spreaders

For more information, order our Cage Farming Aquaculture Catalogue: www.akvagroup.com
Dedicated aquaculture solutions

AKVA group offers tailor made solutions for a wide range of species both land based and cage farming aquaculture. Here’s some examples;
Aquaculture continues to be the fastest growing animal food-producing sector. To succeed in generating necessary growth in aquaculture, we need to apply new knowledge and implement new technology.

GLOBAL TRENDS

State of the world aquaculture

When technology meets biology

Fish and seafood - a sustainable source.

By 2050 the world population will reach 9.7 billion according to WHO. Aquaculture will probably be the solution to future food demand and play an essential part in preventing hunger and malnutrition. Fish is a sustainable protein source with high nutrition levels. But to achieve growth and maintain sustainability it is important to invest in technology development and contribute to a sustainable and efficient industry.

The fish and seafood industry is a sustainable industry and farmed fish has a lower climate impact than meat and dairy products. The reason for this is that the fish does not use energy to maintain body temperature higher than their surroundings and that the fish therefore utilize the feed resources in a highly efficient manner.

Using the ocean as the new food chamber is essential to feed an increasing population with healthy nutrients, good protein sources and Omega-3. Growth is, however, a challenge and at the moment, the major seafood companies report reduction in production volumes due to biological challenges.

In order to succeed in generating the necessary growth in aquaculture, we need to apply new knowledge and implement new technology. The use of recycling technology to produce what is called postsmolt will probably be an important focus area in the years to come. One of the most interesting research findings in aquaculture shows that postsmolt has a lower infection-rate of lice and that it tolerates lice treatment better.

New trends are pushing LBT

LBT (Land Based Technologies) is put under pressure from newcomers in fish farming as the growing demand for fresh fish increases the number of people asking for new and better land based systems.

In the Middle East and on the African continent easy-to-grow fish species fetch remarkable high prices if delivered fresh or live. African catfish, tilapia and barramundi are most popular and pretty straightforward to grow once they have passed the juvenile stage. The bottleneck is however the supply of sufficient numbers of juvenile fish to grow on further in either cages or land based farms. As production of fish feeds seems to develop well alongside the increased production, hatchery and fingerling production are still struggling to meet target.

The key to successful juvenile production is high water quality and hygienic conditions that are not always available in new aquaculture producing countries. Introduction of improved land based technologies is of vital importance to reach the numbers needed, and most often simple recirculation systems will highly increase the survival rate. Hereto is the need for education and training to develop the required competencies for coming fish farmers in new regions of aquaculture.

New project in the Middle East.

Bakkafrost expanding in RAS

Bakkafrost is the leading salmon company in the Faroe Islands staying in front now building several new recirculation aquaculture systems (RAS) to support future expansions. The supplier of the systems is Aquatec Solutions, a new company brand within AKVA group specializing in recirculation technology. Projects at the sites Nordtoftir and Vidareiði are in the final phase of construction and now starting up production. Construction of the largest project Á Strond began in Autumn 2016 and is expected to be in full operation during 2018.

The Strond project is probably the world’s largest system of its kind, says Regin Jacobsen CEO at Bakkafrost. We want to maintain the highest standards in relation to fish welfare and sustainability building up a secure base for our future smolt production. The land based expansion is part of our aim and strategy to stay ahead as a world-class company producing high quality and healthy salmon for the world market.

The Strond farm consists of a hatchery, a start feeding system, 2 parr systems and 6 smolt systems growing fish to post smolt sizes up to more than 500 gram. Tanks are made of precast concrete at diameters up to 18m diameter and more than 5m deep holding water volumes of 1200 m³ each. The maximum daily feeding capacity is some 20,000 kg metabolized by the biofilters of 9 separate RAS water treatment systems.
General Disclaimer:
All specifications in the catalogue are subject to change without prior notice or obligations on the part of AKVA group. AKVA group shall not be held liable for possible errors in this catalogue. Product specifications, performance data, warranties and general terms and conditions of sale, must be described and verified in sales contracts. Local and regional product variations may apply.

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