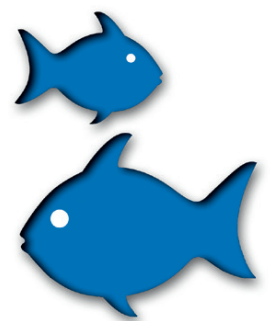


# LAND-BASED AQUACULTURE



## PUMPING SOLUTIONS FOR RAS-TECHNOLOGY

THE BLUE REVOLUTION  
LAND-BASED FISH FARMING  
LIFTING PUMPS  
FILTER PUMPS  
FEEDER PUMPS  
CIRCULATION PUMPS  
CUSTOM-MADE SOLUTIONS



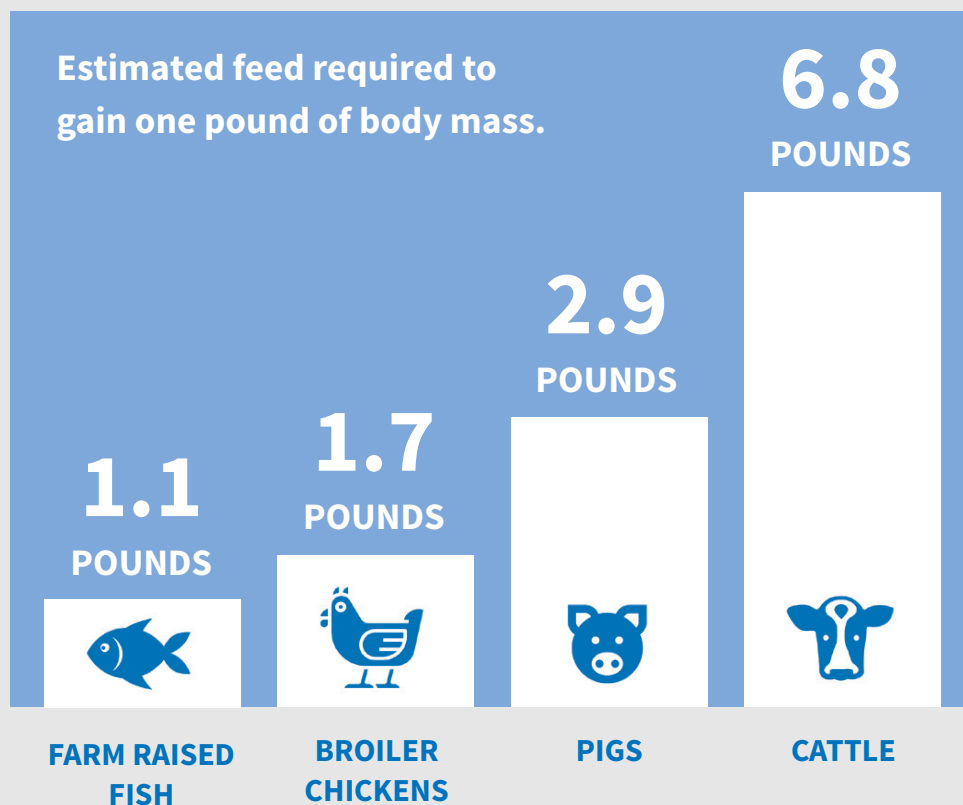
**KW PUMPER**  
PART OF WÜNSCHE A/S

## The blue revolution

The global demand for farmed fish is increasing rapidly, and with the development of land-based fish farms the demand can be met.

The advantages of land-based fish farming are many, and amongst other it focuses on low environmental footprint, local production, minimum water requirement, sustainable production methods, increased food demand, and a healthier fish product.

### FISH CONVERT BETTER...



*Cattle convert 1:6.8, meaning that you feed the cattle 6.8 times as much as you get out of the cattle as eatable meat at the end. Fish on the contrary convert 1:1.1 and therefore is a much more efficient source of protein.*

**This, combined with the fact that the population of the world is growing, increases demand for farmed fish – and thus land-based fish farming is the blue revolution – the new aquaculture.**

## The heart of land-based fish farming

The cornerstone of land-based fish farming is the RAS-technology that lifts, filters, and circulates the water. And the pumps are the heart of this technology.



**We aim** at supporting land-based fish farming through the development and supply of innovative and energy-efficient pumping solutions for the RAS-technology in land-based aquaculture.



**We contribute** to projects by meeting our clients as early as possible in the planning process to meet their needs and support them in the dimensioning of their pumping solutions.



**We specialize** in pumping solutions for RAS-technology in land-based fish farms. We have a long experience in dimensioning and development of highly effective and water efficient pumps both within lifting, filtering, and circulation of water. Our pumping solutions are proven to be the most effective and energy efficient pumps on the market. They are the heart of land-based fish farming.

*Pumping solutions  
for RAS-technology*

## Lifting pumps

The propeller pumps from Veneroni are lifting pumps and used as the head pumps in RAS-installations. The pumps are available both as vertical and horizontal models. Built to lift large volumes of water at low and medium head with maximum efficiency. Customized for specific needs.



- Available in both 1, 2, and 3-step
- Up to 2.700 liters per second
- Motor max. 150 kW
- Water lift max. 18 meter
- Outlet 150 mm to 900 mm
- Drain above or below suspension
- Ajustable propellers
- Available both as vertical or horizontal solution
- Available for both in-tank and out-of-tank installations
- Steel, stainless steel, bronze or iron cast
- Fusion Bonded Epoxy for seawater
- High efficiency at low consumption
- Most effective pump for lift of large volumes of water at low and medium head
- Typical applications 300 - 1.000 l/s at 3-6 m. head
- Our FBE pump has proven robuste towards seawater in installations as head pump.



# Head pumps

We have clients with RAS-installations around the World.  
Our clients are among the leaders within development of recirculation technologies in land-based fish farms.  
We have supplied pumping solutions to many sites, e.g. Tasmania, Chile, Denmark, and USA.

## CASE: Homestead - Florida - USA

Following two years of intensive work KW Pumper has, in collaboration with Billund Aquaculture, become the preferred supplier of the main RAS pumps for the first stage of the prestigious salmon farming project based in Homestead, Florida, USA.

- Propeller and centrifugal pumps
  - World's largest land-based fish farm
  - Owned by Atlantic Sapphire
  - RAS-facility built by Billund Aquaculture
  - Pumps designed and supplied by KW Pumper
- First stage:
    - 36 head propeller pumps
    - 4 post smolt lift pumps
    - 33 selfpriming centrifugal pumps.



*Propeller pumps*

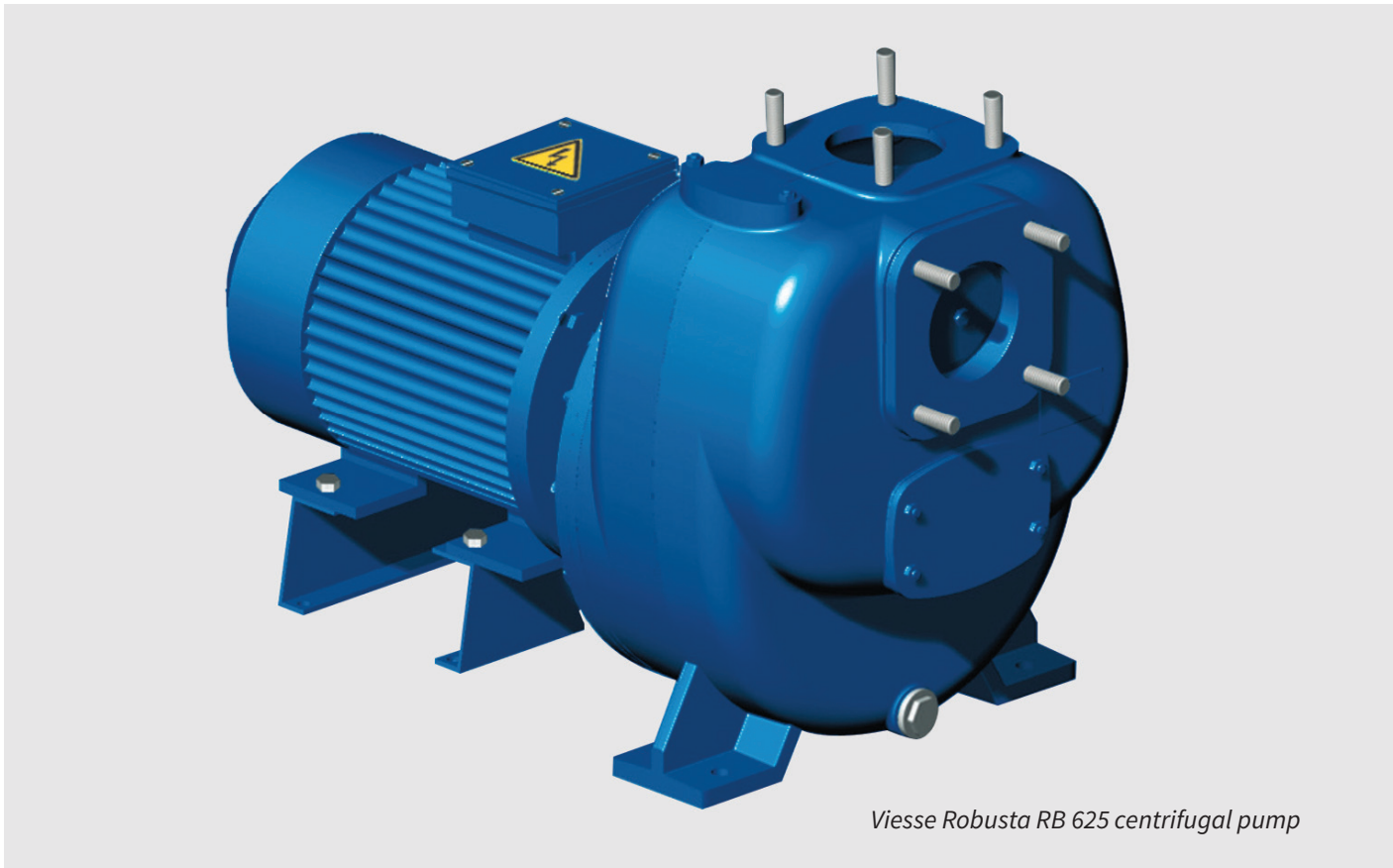
## Filter pumps

### The “Robusta” series filter pumps

The centrifugal pumps “Robusta” series from Viesse are designed to comply to heavy duty applications with pipe connections from 4” - 6” - 8”.

These pumps are all self priming centrifugal pumps suitable for sewage and scavenge water in a larger scale.

- Range up to 550 m<sup>3</sup> per hour
- Range up to 28 meters head
- Range from 9 kW to 37 kW electrical motors
- Available in different materials depending on environment and water salinity
- Pipe connection 4”, 6” or 8”.



*Viesse Robusta RB 625 centrifugal pump*

# Sewage and

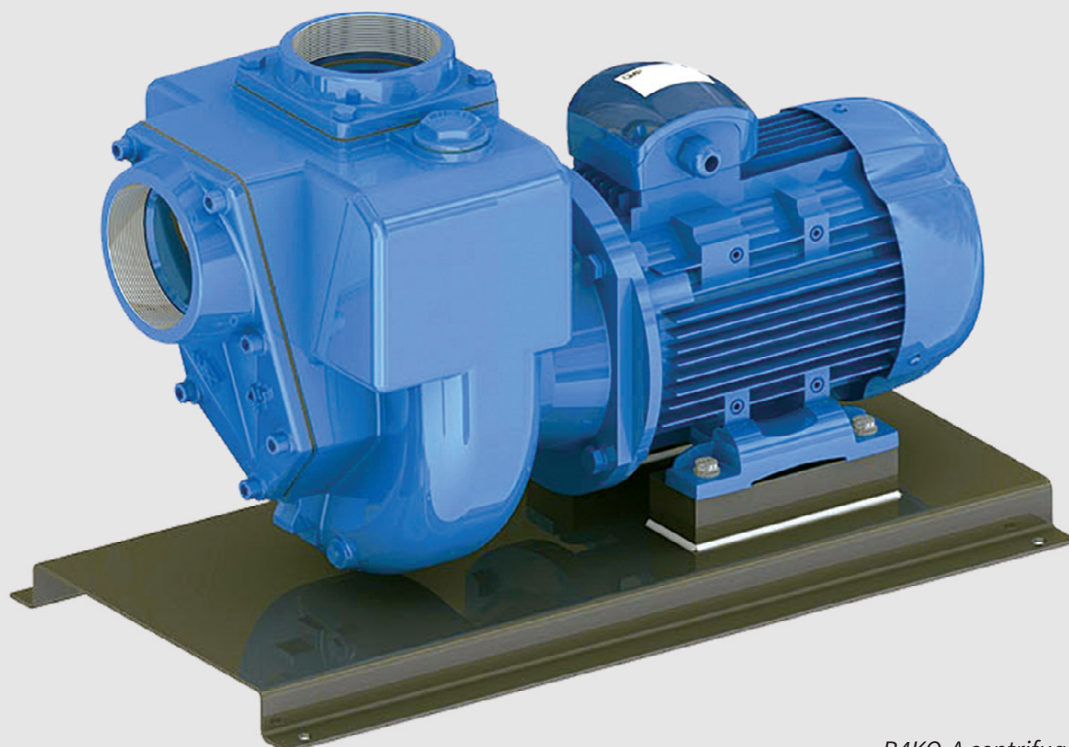
## Filter pumps

### The KQ- and XR-series filter pumps

The centrifugal pumps from GMP are designed for clear or slightly dirty waters, typically for filter applications of water in land-based fish farms with pipe connections 3" and 4".

These pumps are all self priming centrifugal pumps suitable for sewage and scavenge water.

- Range up to 137 m<sup>3</sup> per hour
- Range up to 34 meters head
- Range from 2,2 kW to 15 kW electrical motors
- Available in different materials depending on environment and water salinity
- Pipe connection 3" or 4".



*B4KQ-A centrifugal pump*

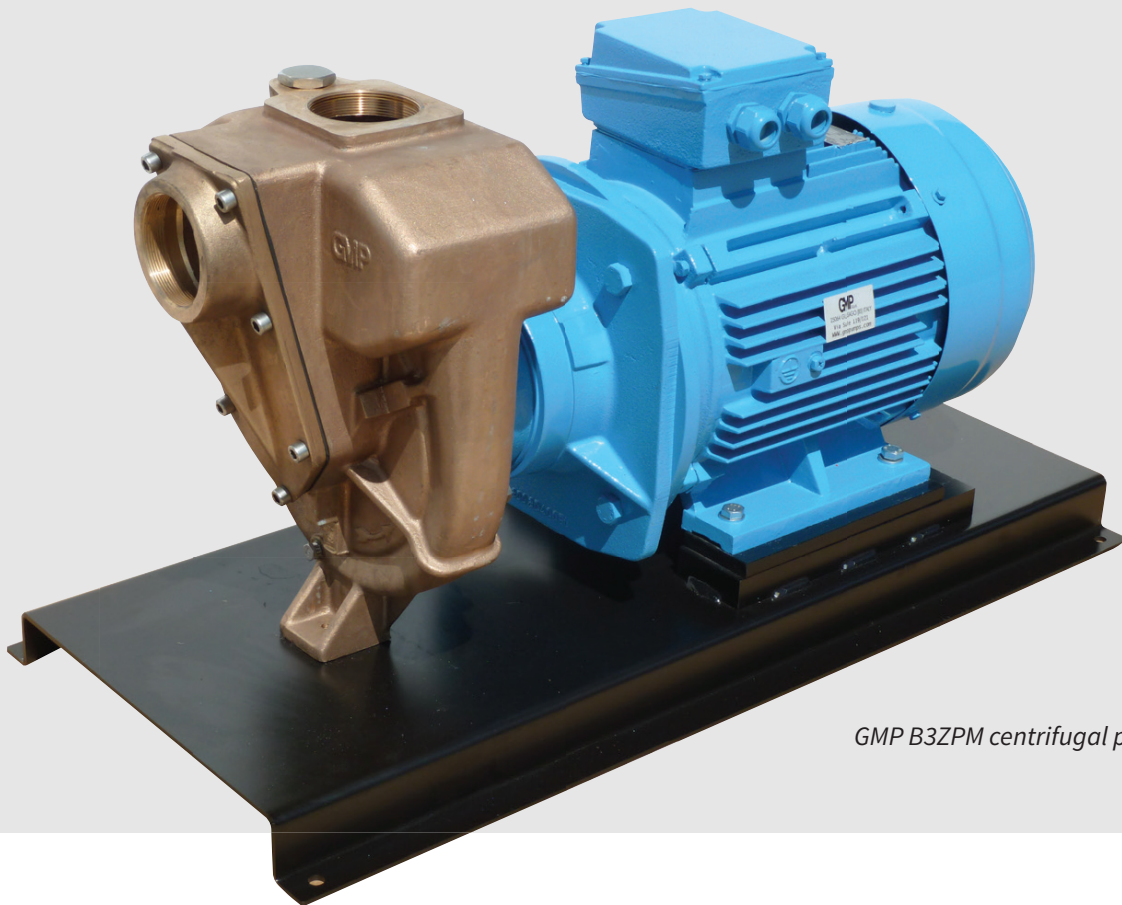
*scavenge water*

## Feeder and circulation pumps

### THE ZPM-series

These pumps from GMP are designed for feeding of water at high pressure and volume. Available in different materials depending on environment and water salinity. The pump is a self priming centrifugal pump, and is typically used as water supply pump from ocean to tank facility.

- Range up to 75 m<sup>3</sup> per hour
- Range from 15 - 22 kW electrical motors
- Range up to 76 meters head
- Available in different materials depending on environment and water salinity
- Pipe connection typically 3".



*GMP B3ZPM centrifugal pump (18,5 kW)*

*Feeder*

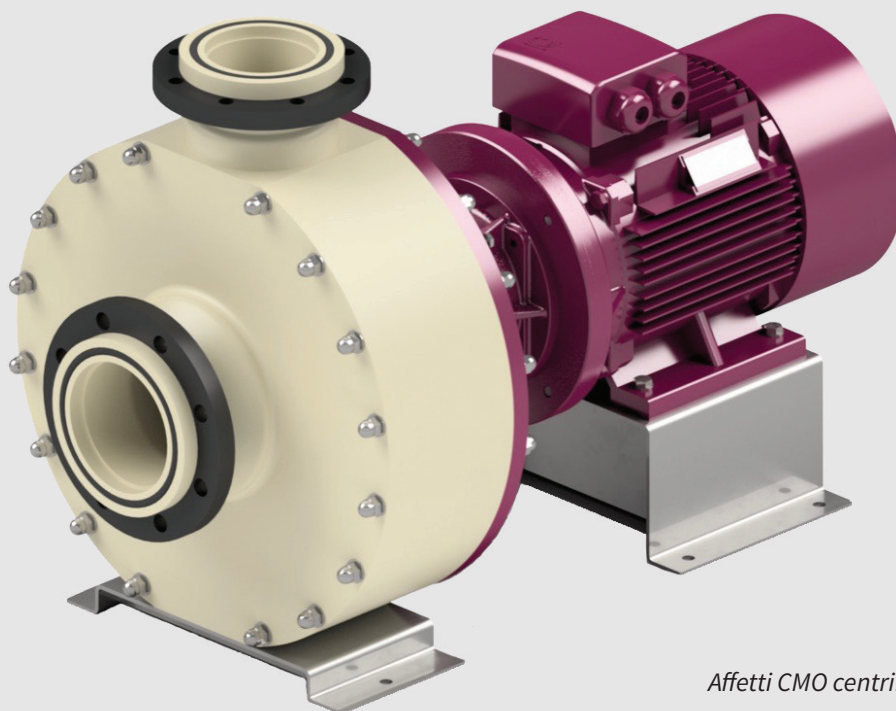


## Feeder and circulation pumps

### The CMO-series

These pumps from Affetti are designed to withstand corrosive environments. Built using special thermoplastics and synthetic glass-fibre reinforced resins. Suitable for circulation of cooling and clean water. Ideal for use in land-based aquaculture. Typically application: 280 m<sup>3</sup> per hour, 16 meters head, 22 kW.

- Range up to 350 m<sup>3</sup> per hour
- Range up to 72 meters head
- Range up to 55 kW electrical motors.
- Pipe connection up to DN250 (10")
- Highly resistant in corrosion



*Affetti CMO centrifugal pump*

# Circulation

## Custom-made

KW Pumper has large experience in dimensioning and development of highly effective pumps for very special needs. We collaborate with our clients to solve the challenges by inventing new methods and developing specific dimensions to meet the needs required in the RAS-technology.

We are open for collaborations and development of new custom-made pumping solutions and always thrive for the optimal solution.

## Reverse propeller pump

Custom-made pressurization pump designed by KW Pumper in cooperation with Billund Aquaculture. Insuring circulation of return flow from bio-filter at Atlantic Sapphire, Hvide-Sande, Denmark.

*Custom-  
made*

*Reverse pump*



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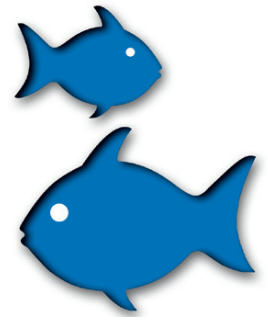
## CASE: Langesand - Denmark

An urgent rescue mission in a land-based facility in Denmark, where KW Pumper together with Billund Aquaculture came up with a novel and inventive way to improve the flow conditions in the facility.

- Propeller pump
- Reverse pressurization pump
- Insuring circulation of return flow from biofilter
- Owned by Atlantic Sapphire
- Designed in cooperation between Billund Aquaculture and KW Pumper
- Pumps delivered by KW Pumper.



Case



We have been in the business of efficient handling of water for half a century. Our continuously curious approach has given us a privileged position to participate in the challenge of forming and developing efficient and sustainable pumping solutions. Our solutions have proven to be the most effective and energy-efficient choice in the market.

Our focus is on handling water transport. KW Pumper is the official partner and certified agent in Scandinavia for these premium pump brands from Northern Italy:



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