





Alfa Laval Copenhagen

Water & Waste Treatment solutions
“Croatian Danish Water Days” May 2019

Bernard Kozjek, Food & Water Division Manager, SEE region

Steen Rosenbom, Alfa Laval Copenhagen, BU Decanters

Version 30-04-2019-R05

The company

Alfa Laval is a leading global provider of specialized products and engineered solutions.



We serve most industries

Biofuels
Biotech and pharmaceutical
Chemicals
Crude oil refinery
Engine and transport
Fluid power
Food and beverages
HVAC
Industrial fermentation
Latex
Machinery



Marine and diesel
Metal working
Mining and mineral processing
Oil and gas
Power
Pulp and paper
Refrigeration and air-conditioning
Semiconductor systems
Steel and coke oven gas
Sugar
Water & Wastewater treatment

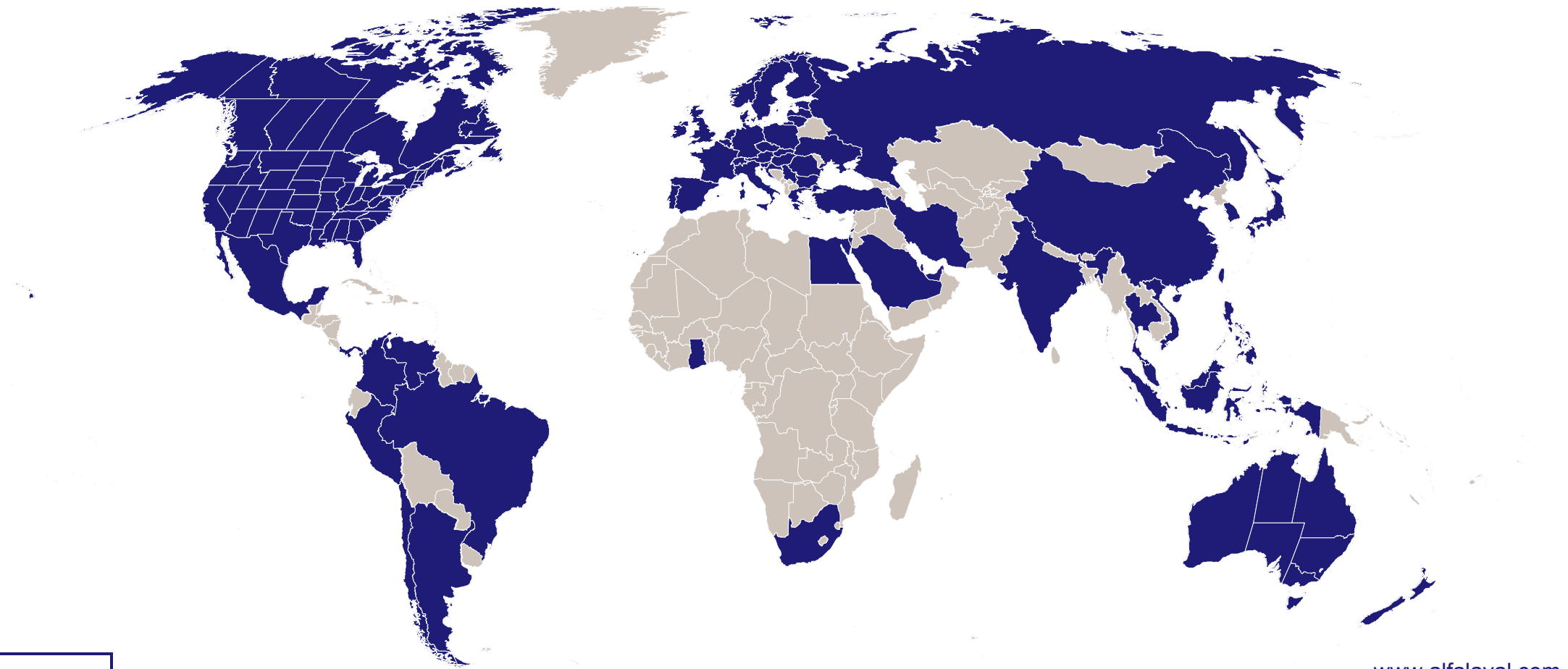
A global company



- * 39 production units*
- * More than 100 service centres
- * Sales companies in 55 countries
- * Other sales representation in 45 countries

* Plus a number of minor production and assembling units

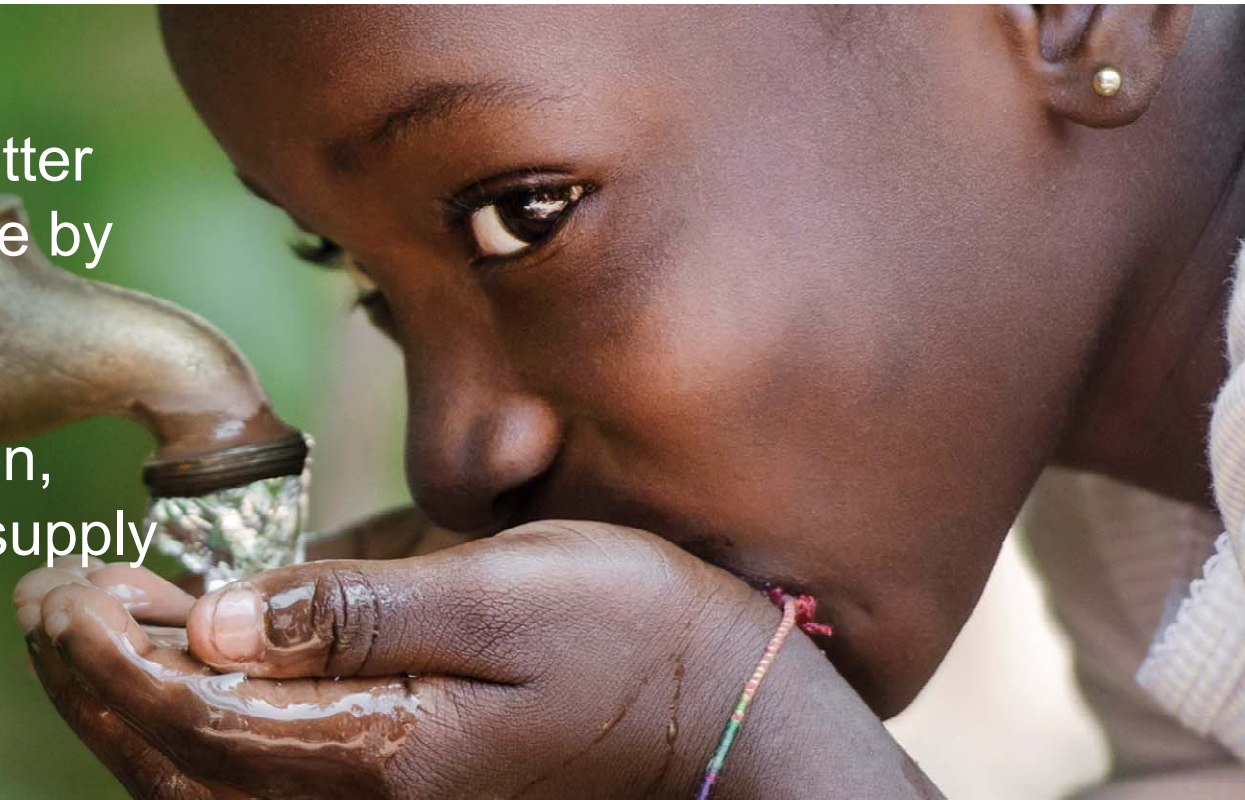
..with strong local presence



www.alfalaval.com

Solutions

Alfa Laval aims at creating better everyday conditions for people by providing highly efficient and environmentally responsible solutions for energy production, marine transportation, water supply and food processing.



Contribution to sustainable development

- Examples of how Alfa Laval offering contributes to the UN Global Goals

2 Alfa Laval products and solutions improve shelf life, reduce waste and make food production hygienic and safe.

3 Alfa Laval delivers efficient, hygienic equipment that delivers sustainable performance to the pharmaceutical industry.

6 Alfa Laval offers a wide range of technologies to treat wastewater contributing to clean water across the globe.

7 Alfa Laval products are involved throughout the renewable production process, from heating and cooling to mixing and separation.

9 Alfa Laval invests heavily in R&D, launches between 30-40 new products per year and has over 3,000 patents.



**SUSTAINABLE
DEVELOPMENT
GOALS**

12 Alfa Laval's ambition is to make every new product more efficient than its predecessor in a life cycle perspective.

14 Alfa Laval offers a whole range of products in the areas of energy and environment, mainly for customers in the marine industry.

17 Alfa Laval has been a signatory of the UN Global Compact since 2011.

Three business divisions



Energy

This area covers a wide range of industries such as HVAC, oil & gas, chemicals, biofuels – with a special focus on energy efficiency.



Food & Water

Offers products, solutions and systems in the areas of food processing and in **water and wastewater treatment**.



Marine

The company has supplied the marine industry since 1917 and has today a broad offering incl. environmental marine products.

Key technologies

Our key technologies are adapted to each customer segment and offered separately or combined into optimized solutions.

HEAT TRANSFER

ENERGY DIVISION

- Brazed & Fusion bonded heat exchangers
- Gasketed plate heat exchangers
- Welded heat exchangers

FOOD & WATER DIVISION

- Food heat transfer
- Food systems
- Water and Waste Water heat transfer

MARINE DIVISION

- Marine separation & Heat transfer equipment
- Boilers & Gas systems

SEPARATION

ENERGY DIVISION

- Energy separation

FOOD & WATER DIVISION

- **Decanters and Drum thickeners**
- **Membrane filtration**
- High speed separators for
- **Water & Wastewater treatment** and for Food systems

MARINE DIVISION

- Marine separation & Heat transfer equipment

FLUID HANDLING

FOOD & WATER DIVISION

- Food systems
- Hygienic fluid handling

MARINE DIVISION

- Pumping systems

Processes

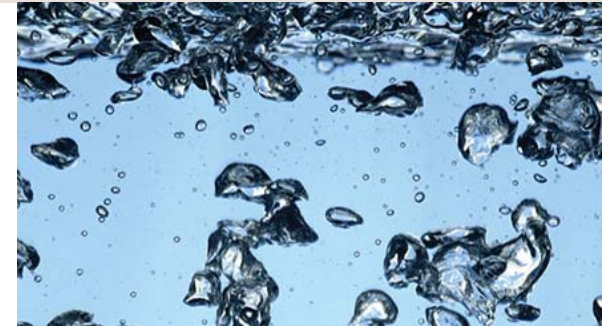
Complete spectrum for wastewater treatment

Water line

- Biological wastewater treatment
- Tertiary treatment

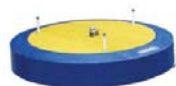
Sludge line

- Thermal sludge treatment
- Sludge thickening
- Sludge dewatering





Biological wastewater treatment



Tertiary treatment / water reuse



MBR membrane modules
Surface-layer decanter
ISO Disc Cloth Media Filter



Thickening



Decanter
Drum thickener



Dewatering



Decanter
Belt press
Plate press



Heat exchangers



Spiral Heat Exchangers

Key technologies

– Separation

Efficient separation of liquids from liquids, of particles from liquids and of fluids and solids from gases

Products:

- * High speed separators
- * Decaners
- * Membrane filtration

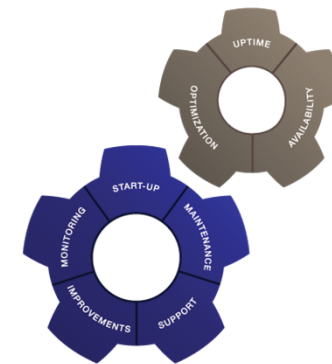


Alfa Laval 360° Service Portfolio

Alfa Laval Performance Agreements are the perfect complement to Alfa Laval equipment.

The 360° Service Portfolio contains all the services needed to reach optimal performance, maximum uptime and operating efficiency.

Service specialists are ready to assist in maintaining and optimizing equipment as operations develop and change over time.



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Service agreements

Alfa Laval Performance Agreements are the perfect complement to Alfa Laval equipment.

They are individually tailored service solutions that combine any of the services in the 360° Service Portfolio.

Based on specific needs, they bring peace of mind by securing top performance and maximum return on investment while giving full control over service costs.



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We help our customers

Turn wastewater into a valuable resource

With water scarcity around the world, the possibility to turn sewage into clean, reusable water has immense potential. For this, Alfa Laval's membrane solution is both efficient and sustainable.

More
info



www.alfalaval.com

We help our customers

Clean microplastics from the ocean

Studies show microplastics have devastating impact on the marine environment. In a Danish research project, Alfa Laval's membranes proved to effectively remove this invisible menace from wastewater.

More
info



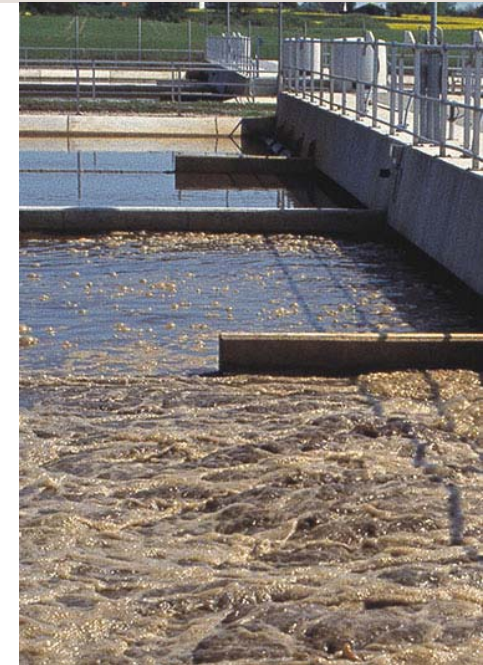
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Products and knowledge

A focused solution

Working with Alfa Laval helps you:

- Lower total operating costs thanks to greater overall plant efficiency
- Reduce polymer consumption, energy use and disposal costs
- Optimise operations according to your situation
- Get higher capacity with fewer process disturbances
- Ensure on-time and on-budget project completion
- Upgrade traditional WWTP plants to meet more restrictive demands on effluent quality and heat recovery



For the long run

Continuous service for high plant efficiency and low lifecycle costs

- Global network of service centres, spare part hubs and field service engineers
- Local support
- Advice to improve operations and supply equipment upgrades when conditions change
- Training programs
- Custom-made service agreements that allow you to accurately budget service costs, maximize uptime, improve cost-efficiency and performance
- Peace of mind







ATTACHMENTS

Water & Waste Treatment solutions

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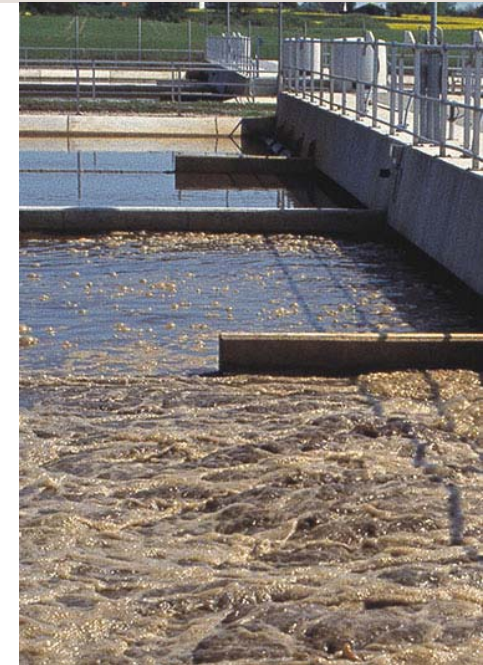
Alfa Laval Process and Products – Water and Waste

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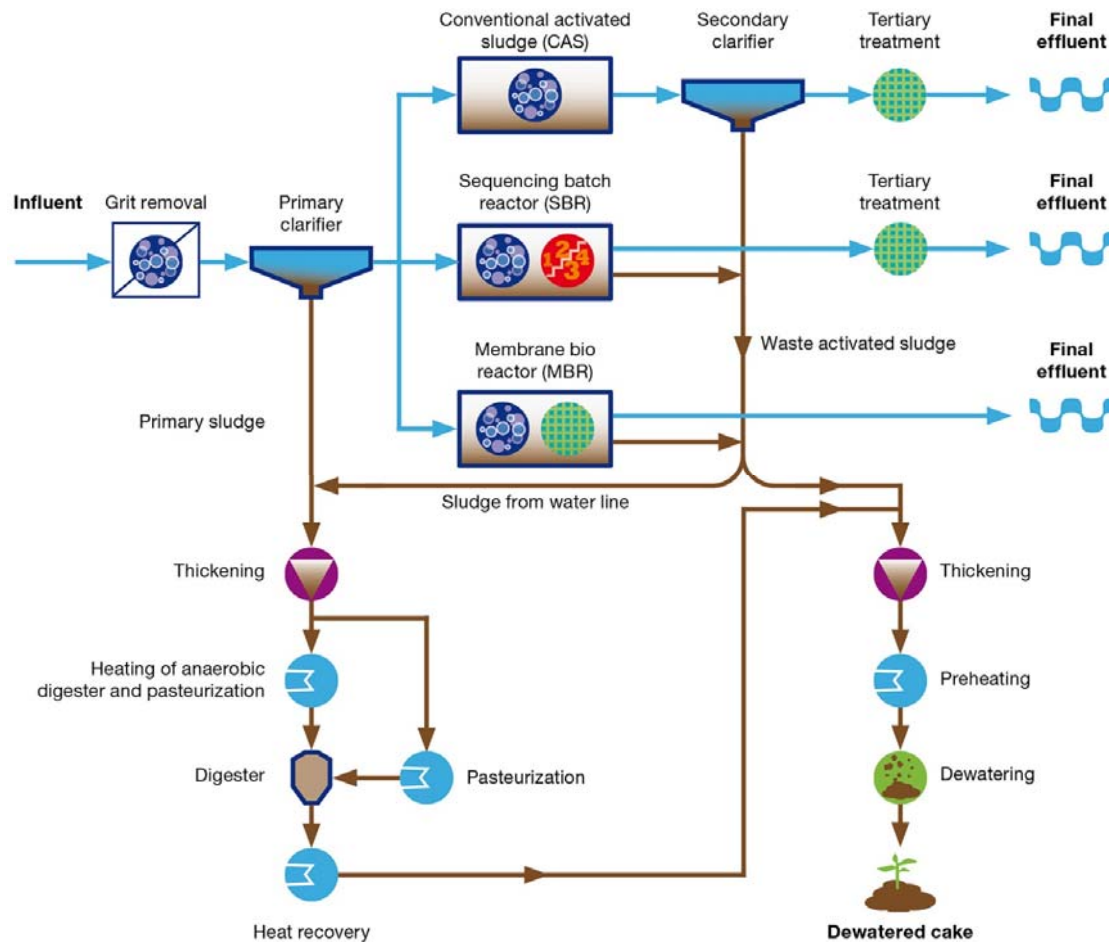
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PROCESSES AND PRODUCTS



Process overview

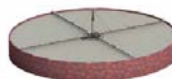
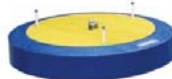


Alfa Laval equipment

-  Wastewater treatment
-  Filtration
-  Sequencing batch reactor
-  Thickening
-  Dewatering
-  Heat exchangers
-  Fluid control



Biological wastewater treatment



Tertiary treatment



Thickening



Fluid control



Dewatering



Heat exchangers



Processes

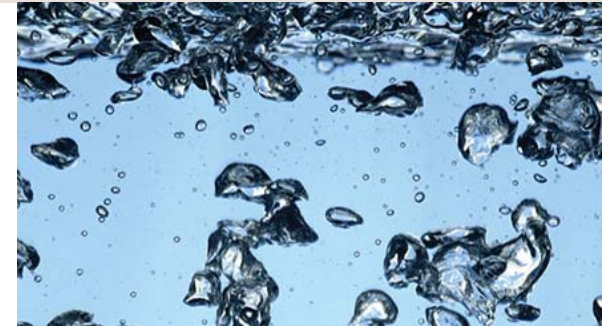
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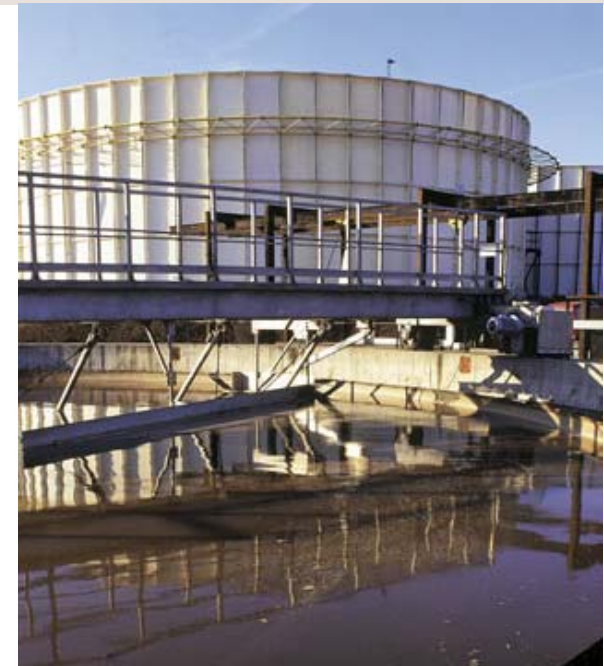
BIOLOGICAL WASTEWATER TREATMENT



Biological wastewater treatment

Components and modules

- Membrane Bio Reactor (MBR)
 - MBR modules
- Sequencing Batch Reactor (SBR)
 - Surface layer decanters, automation equipment, etc.
- Wastewater treatment package plants
- Distributors for trickling filters



An updated module for a changing world

Low cost of ownership and guaranteed high quality permeate

- Alfa Laval's MBR membrane modules provide high permeate quality at a low operating cost
- Integrating unique technologies providing what is important to a modern wastewater treatment plant
 - High quality permeate
 - Low energy consumption
 - Low maintenance costs
- Over 150 references worldwide over the past 10 years testify to the quality of Alfa Laval MBR membranes



Treatment has now become reuse

Alfa Laval MBR membranes provide a short-cut to water re-use

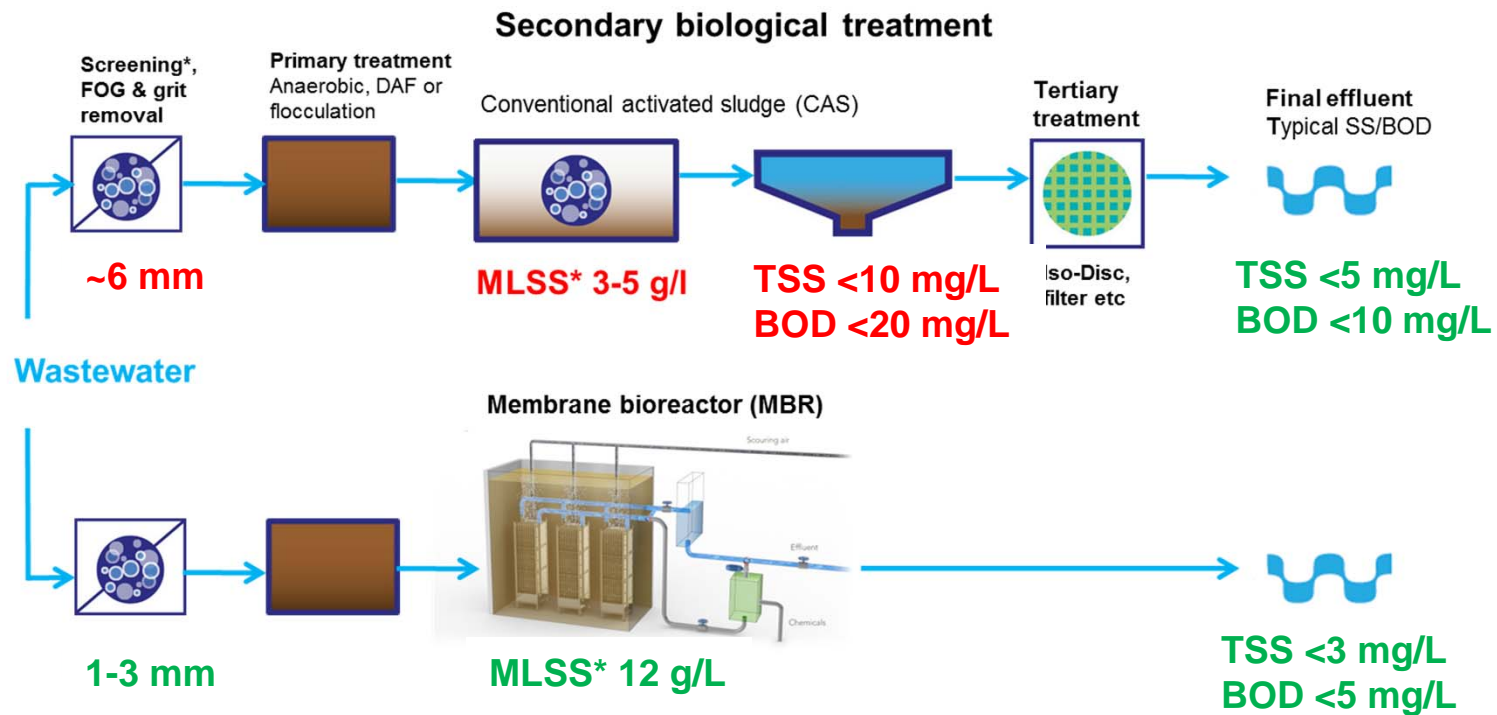
- MBR not only treats wastewater – it creates an efficient short-cut to beneficial re-use
- Permeate from Alfa Laval MBR membranes will always be suitable as feed water for RO or NF
- Both communities and nature can benefit with high quality water being used for many non-potable applications



Alfa Laval MBR membranes play a role in re-use of water at this bioenergy site in the USA

Alfa Laval MBR vs. Conventional technology

All-in-one MBR process with small footprint and effluent with reuse quality



*MLSS: Mixed liquor suspended solids

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Every drop counts

Recovery with Alfa Laval MBR membranes reduces your environmental impact - and costs

- Industrial process water
- Water for cooling towers
- Wash water generation
- Irrigation
- Snow making at ski resorts
- Wetlands, wildlife habitat, stream and lake augmentation
- Ground water recharge



Water treated with Alfa Laval MBR can reach potable water quality if followed by final polishing

AS-H Sequencing Batch Reactor (SBR)

Eliminate the clarifier

- Allows flexible and efficient treatment of low and variable wastewater flows
- Small footprint – all treatment steps in the same tank
- Cost-efficient way to achieve lower effluent limits
- Our patented surface-layer decanter is the best on the market
- Complete process design delivered including supply of diffuser, mixer, WAS pump, surface layer decanter and process control system



TERTIARY TREATMENT



AS-H Iso-Disc Cloth Media Filter

Tertiary treatment for low effluent limits and water reuse

- High-purity, reuse-quality filtrate
- Solids capture down to 10 microns, without filter mat run-in time
- High solids and hydraulic loading with small footprint-to-flow ratio
- Robust yet simple filter
- Outside-in filtration
- Most flexible design on the market due to availability of both square and rectangular discs



SLUDGE THICKENING



Sludge thickening

- Decanters
 - ALDEC, ALDEC G2, ALDEC G3
- Gravity belt thickener
 - AS-H Belt Thickener
- Drum thickeners
 - ALDRUM, ALDRUM G3



Decaners

ALDEC, ALDEC G2, ALDEC G3

- Perfect for high capacity thickening duties
- Possible to thicken without polymer
- Wide range from basic to “state of the art”
- Clean, enclosed, odour-free operation
- Lower power consumption with G3
- User-friendly and flexible controls, Basic Core Controller (BCC) and 2Touch



Drum thickeners

ALDRUM, ALDRUM G3

- Clean, enclosed, odour-free design
- Straightforward, robust design
- Long life time filter cloth
- Flushing at intervals saves water
- Very gentle on flocculated feed saves polymer and gives high recovery
- Safe design with slam proof cover and cover switch availability



AS-H Belt Thickener

Cost-effective thickening of municipal and other flocculating sludge

- Trouble-free operation with low cost
- Minimal operator attention and maintenance
- Long lifetime bearings and rollers
- Reduced energy use
- Patented ramp ensures optimal thickening performance, even on difficult WAS
- Integrated mixing valve lowers polymer consumption



SLUDGE DEWATERING



Sludge dewatering

- Decanters
 - ALDEC, ALDEC G2, ALDEC G3
- Belt presses
 - AS-H Belt Press G2
 - AS-H Belt Press G3
- Plate Presses
 - AS-H Fully Mechanised Plate Press with side bar design and fully mechanised washing machine (optional)
 - AS-H Semi-mechanised Plate Press with side bar
 - ASH Manual Plate Press for pilot and lab tests



Decaners

ALDEC, ALDEC G2, ALDEC G3

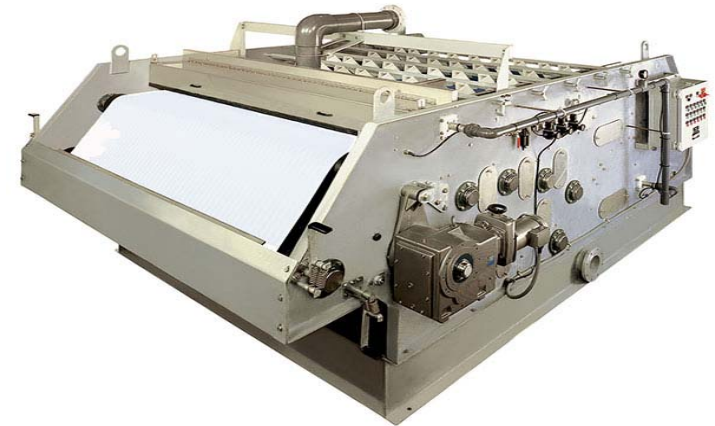
- Wide range from basic to “state of the art”
- Sizes from 200 to 1,000 mm
- Optimized design according to sludge characteristics
- Focus on low energy consumption
- Higher capacity on same footprint
- User-friendly and flexible controls, with “Basic” or “PLUS” controller



AS-H Belt Press G2

Dewatering at high volume and solids loading, with low polymer and power use

- Higher throughput than competitive units
- Higher dry-cake solids and better filtrate due to unique roller configuration
- Long lifetime heavy duty bearings and rollers
- Low polymer consumption due to unique sludge/polymer mixing technology
- No additional flocculation tank or mixer



AS-H Belt Press G3

Dewatering and thickening in the same unit

- Up to 5x capacity on same footprint as conventional belt press
- Thin feed below 1% dry solids handled at high hydraulic rates due to independent gravity deck
- Low polymer consumption due to unique sludge/polymer mixing technology
- Eliminates need for separate thickening unit
- Low maintenance and easy operation with smart belt alignment and tensioning system
- Long lifetime heavy duty bearings and rollers



AS-H Fully Mechanised Plate Press

Best technology for cake solids to 40% and solids capture over 99%

- Ideal for very high dry cake solids, up to 40%
- Solids capture over 99%
- Easily customized for all dewatering needs
- Operating costs low due to low polymer and energy consumption
- Greatest process and application knowledge in the market



The equation for success is universal

Your unique situation

+

Our complete products

=

An optimized solution
tailored to your needs

... not limited to any
particular technology





Solutions for the circular economy

Alfa Laval Process and Products
for Water and Municipal Waste Treatment

“Croatian Danish Water Days” May 2019

Water and Wastewater solutions

Representatives during Croatian Water Days:

Bernard Kozjek

Food&Water Division Manager SEE

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