



Wafilin Systems

“We believe, we create smart and circular membrane filtration solutions by combining our passion, experience and know-how”.

**We are:
Masters in
Membrains**



Located at the Water Campus Centre for Water & Food Technology



Our Marketfocus



FOOD & BEVERAGE SYSTEMS

We help your business recover resources from process streams

www.wafilinsystems.nl




DAIRY SYSTEMS

We help your business reduce costs and enhance product quality

www.wafilinsystems.nl




Our Partners (membrane suppliers)

We are an independent membrane specialist – best membrane for the right application



Our customers (selection)







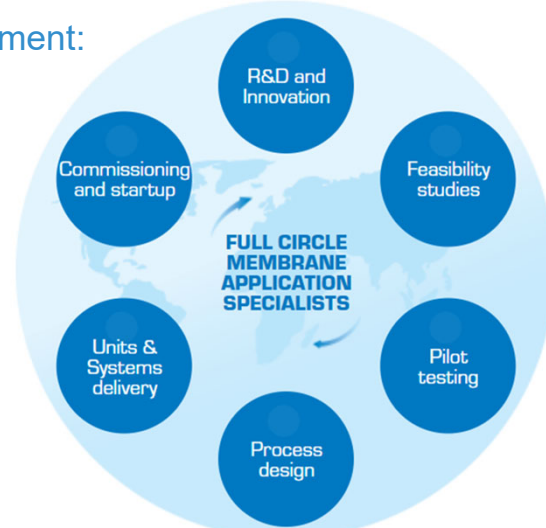







Offering the full circle of application development:

- R&D and Innovation
- Feasibility studies
- 12 Pilot Units
- Process design
- Engineering and project management
- Delivery of systems and projects
- Commissioning and startup of systems
- Aftersales and services of systems




Our PMC's (2018 – 2019)



- Concentrating Whole milk at Farm level
- Disinfection of cheese brine
- Fractionating milk
- Skimming of milk



- Protein recovery from potato starch industry
- Fractionating and purification of sugar streams
- Fatty Acid recovery from food- feed- & agricultural waste streams
- Recycling of blanch water from vegetable industry



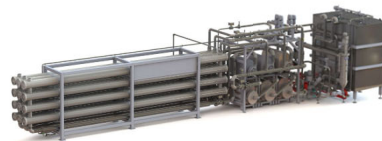
- Recovery of water and energy from the laundry industry



Our solutions – Standard Systems



PurePulse™ Technology



Reverse Osmosis Systems – protein recovery



Multi Stage Membrane Systems



Ultra Filtration – cheese brine



Full Range Membrane Filtration Plant

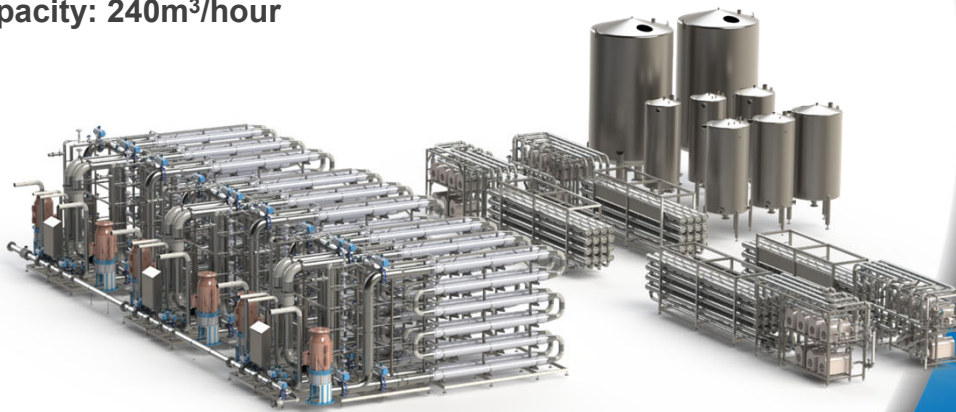


Reference (Turn-key)

Segment: Potato Starch Industry

Process: Ultra Filtration & Reverse Osmosis

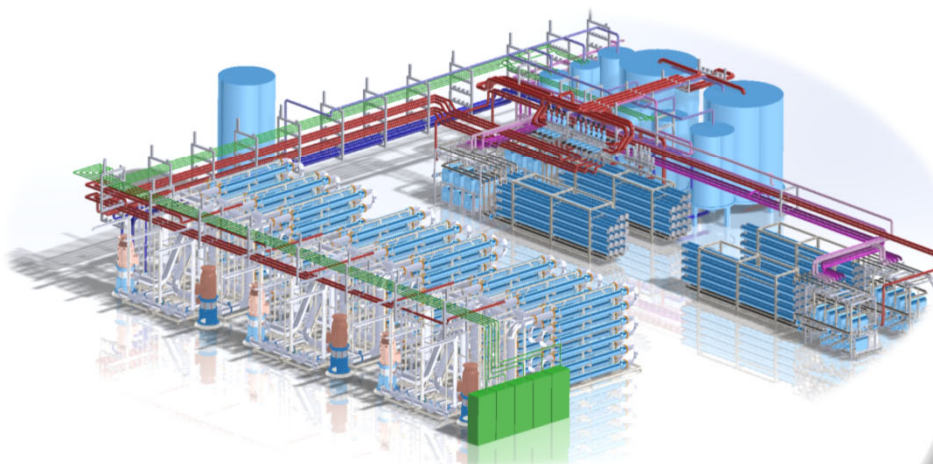
Capacity: 240m³/hour



Purpose: Protein Recovery, Water reuse and Energy reduction



Avebe DUCAM project



Concentrate milk at the farm

Unique Membrane System:

- Single step filtration
- No skimming required
- In-line with milk robot
- **Pure** water removal
- Patented

Concentrates raw milk at the farm:


- 50% volume reduction
- 25% dry matter


No loss of milk quality



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Benefits - farmer

 Storage reduction – 50%

 Cooling reduction – 25%

 Water re-use

 Better price per liter/milk



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Benefits – Dairy factory

Growing demand for dairy products:
Cheese, Yoghurt, Powder



Transport – 50% reduction



Energy – optimized process



New products



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From lab to farm – 2017 & 2018



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Follow up: Robot system connection

Demosite at Farm Level:

1. Connection between robot – filtration system
2. Partnership: farmer, dairy factory, Tetra Pak
3. Product development: cheese, powder, beer
4. Test site – *Dairy Campus Leeuwarden*
 - 550 cows
 - Delaval robot
 - Conference rooms
 - Research facilities
 - International exposure



Quality - water

Parameter	permeate		Tapwater	
	Value	Unit	Value	Unit
Cl	61	mg/L	60,2	mg/L
NO2	<0.05	mg/L	<0.05	mg/L
NO3	0,4	mg/L	8,91	mg/L
PO4	2,54	mg/L	<0.05	mg/L
SO4	1,09	mg/L	1,78	mg/L
TC	69,6	mg/L	53,4	mg/L
IC	7,53	mg/L	49,1	mg/L
Ca	661	µg/L	38100	µg/L
Cu	<25.0	µg/L	86,7	µg/L
Fe	<50.0	µg/L	<50.0	µg/L
K	51700	µg/L	2350	µg/L
Mg	164	µg/L	9380	µg/L
Na	16900	µg/L	66700	µg/L



Source:  wetsus

Concentrate & Permeate



Quality - milk

Free Fatty Acids in milk (BDI): QLIP - analysis

Batch 1	Raw Milk	0,81	mmol/100 g fat
Batch 1	Concentrated milk	1,44*	mmol/100 g fat
Batch 2	Raw Milk	0,52	mmol/100 g fat
Batch 2	Concentrated milk	0,64	mmol/100 g fat
Batch 3	Raw Milk	0,41	mmol/100 g fat
Batch 3	Concentrated milk	0,57	mmol/100 g fat
Batch 4	Raw Milk	0,62	mmol/100 g fat
Batch 4	Concentrated milk	0,66	mmol/100 g fat
Batch 5	Raw Milk	0,66	mmol/100 g fat
Batch 5	Concentrated milk	0,73	mmol/100 g fat
Batch 6	Raw Milk	0,64	mmol/100 g fat
Batch 6	Concentrated milk	0,74	mmol/100 g fat

* Human error effect: opening valves at high pressure

Quality – Bacteria count

Batch	Type milk	parameter		value		maximum
1	Concentrated milk	Cell count 30°C PCMA	BGU	30000	kve/ml	300000
2	Concentrated milk	Cell count 30°C PCMA	BGU	30000	kve/ml	300000
3	Concentrated milk	Cell count 30°C PCMA	BGU	25000	kve/ml	300000
4	Concentrated milk	Cell count 30°C PCMA	BGU	35000	kve/ml	300000
5	Concentrated milk	Cell count 30°C PCMA	BGU	10000	kve/ml	300000
6	Concentrated milk	Cell count 30°C PCMA	BGU	23000	kve/ml	300000

Bacteriological analysis - DMK

Follow up:

Develop: Stand-Alone System demonstration

Demosite at Dairy Campus/Farm

- Upscaled filtration system (5-7m³/uur)
- Containerized unit
- Connected to carousel/parlour (bulk)
- Worldwide applicable (**no** robot needed)
- Independent approach

Launch spring 2020



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Roadmap for 2019-2020

Demosite at Dairy Campus/Farm

Objectives:

- | | Duration: |
|--|-----------|
| 1. Development of a containerized membrane filtration system | 6 months |
| 2. Preparation demonstration site | 1 month |
| 3. Process control between milk carousel and filtration unit | 2 months |
| 4. Determine product quality (milk & water quality) | 2 months |
| 5. New dairy products development based on concentrated milk | 3 months |
| 6. Demonstrate and Explore international potential | 2 months |

Launch: Spring 2020



 **VIDA**
value-added innovation
in food chains

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Thank
You!

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