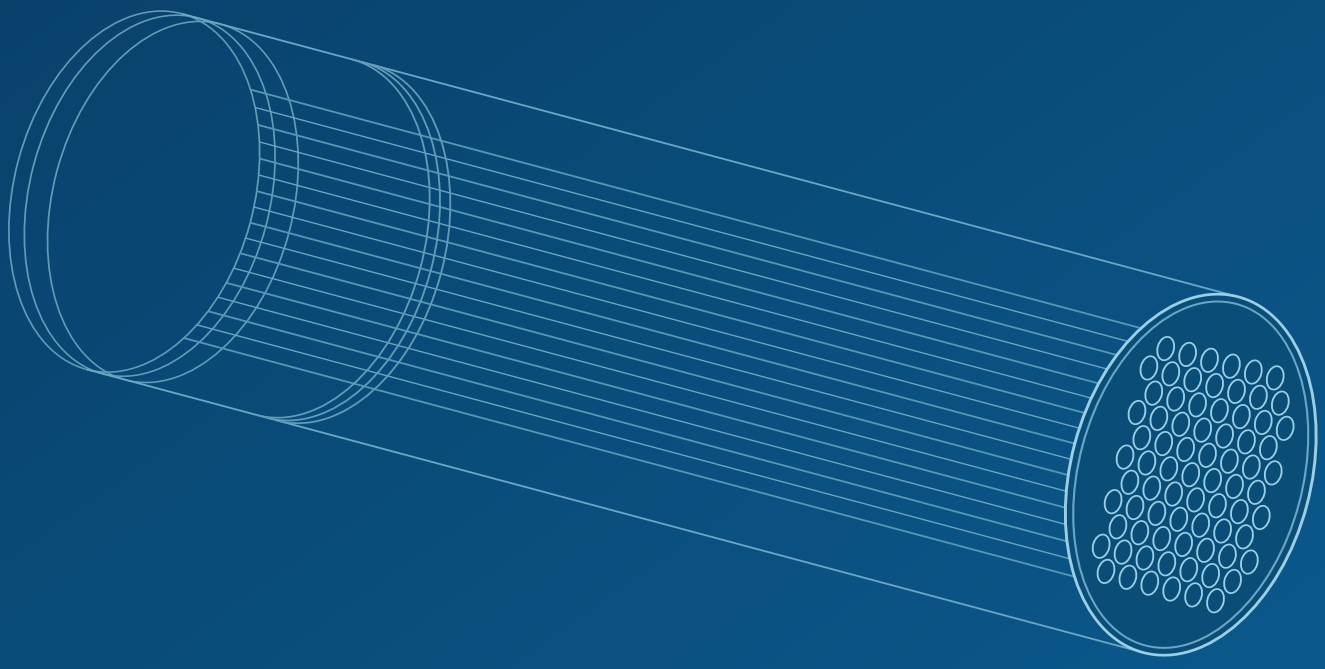
ENGLISH

PROJECT REFERENCES

Industrial water treatment

Ultrafiltration and reverse osmosis



10 case studies

Neptuno Water Technology

neptunoes.com

REFERENCES

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TECHNOLOGY REFERENCE

Biomass recovery from brewery digestate

Brewery wastewater · Anaerobic digestion

Approximate capacity	Module	Commissioned
125 m³/d	UltraFlux™ V8	2019

01

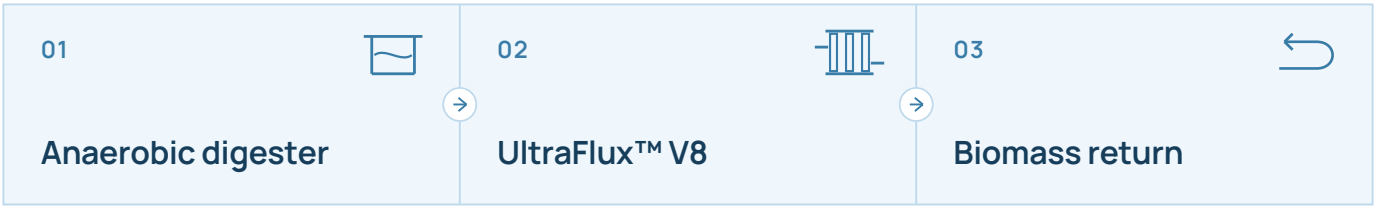
The challenge

The digestate contained 1–2% suspended solids. The brewery needed to draw off clarified water while retaining biomass in the digester.

02

The solution

UltraFlux™ V8 filtered the digestate directly. Permeate went to discharge and the concentrate returned to the digester through the foam-control nozzles.

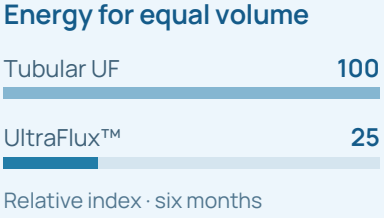


03 / RESULTS

75% less energy for filtration

The return stream reached up to 4% suspended solids. The energy benchmark was a tubular UF system treating comparable wastewater.

- Concentrate returned to the digester
- Clarified permeate for discharge



TECHNOLOGY REFERENCE

Thickening poultry digestate before dewatering

Anaerobic digestion · Nutrient recovery

Approximate capacity	Module	Commissioned
30 m³/d	UltraFlux™ V8	2019

01

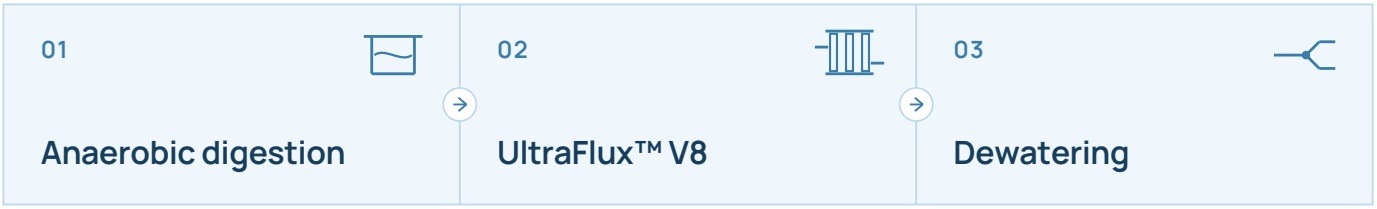
The challenge

Dewatering the entire digestate also sent its water on to drying. The process needed a lower hydraulic load and a liquid stream suitable for algae cultivation.

02

The solution

UltraFlux™ V8 took digestate directly from the digester. Concentrate went to dewatering, leaving a separate permeate stream for nutrient recovery.



03 / RESULTS

Over 4.5% suspended solids in the sludge

Sludge exceeded 4.5% suspended solids at the inlet to mechanical dewatering. Removing water at the UF stage reduced the volume handled by the dewatering equipment.

- Lower hydraulic load on dewatering
- Nutrient-rich permeate

Outlet streams

→ Permeate
Algae cultivation

→ Sludge
Dewatering

TECHNOLOGY REFERENCE

Algae concentration before centrifugation

Microalgae cultivation · Biomass separation

Approximate capacity	Module	Commissioned
114 m³/d	UltraFlux™ V8	2020

01

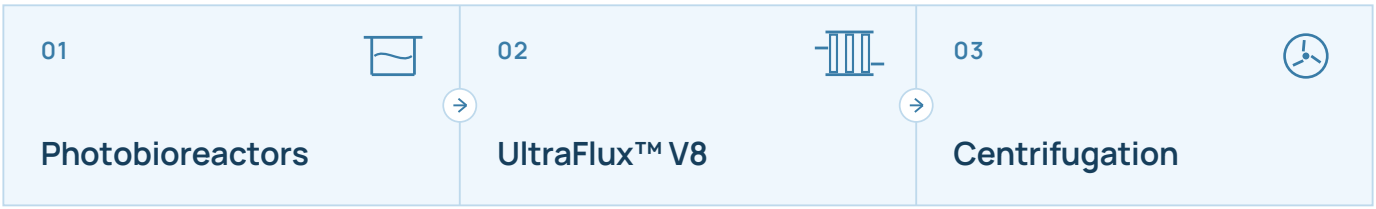
The challenge

Light penetration limits culture density. Feeding the centrifuges with such a dilute suspension extended operating cycles and cleaning time.

02

The solution

An UltraFlux™ V8 unit between the photobioreactors and centrifuges removed part of the culture water, delivering a more concentrated suspension to mechanical separation.

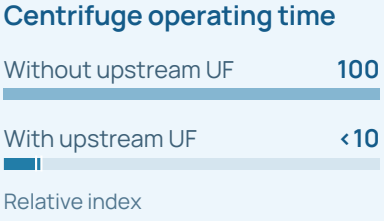


03 / RESULTS

Over 90% less centrifuge operating time

Centrifuge operating time fell by more than 90%. With fewer machines running, operators also spent less time on monitoring and cleaning.

- Fewer centrifuges in service
- Commissioned in one day



TECHNOLOGY REFERENCE

Ultrafiltration of saline water after lime softening

Oil and gas · Containerised treatment

Approximate capacity	Module	Commissioned
946 m³/d	UltraFlux™ V10XL	2022

01

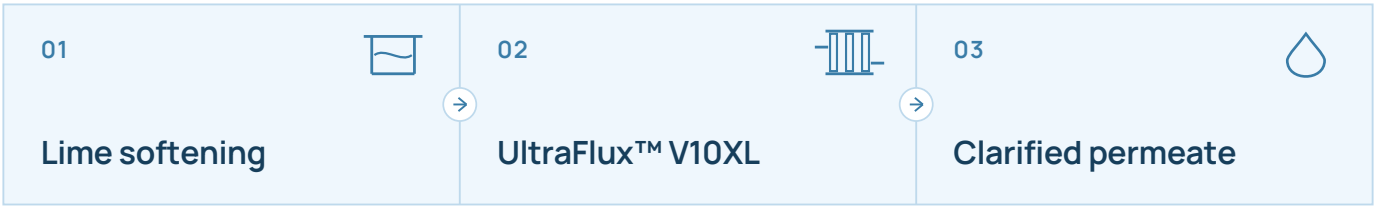
The challenge

Lime softening generated precipitates in water containing 120,000–130,000 ppm NaCl. The solids separation step had to fit inside the existing container.

02

The solution

UltraFlux™ V10XL modules fitted the existing UF mounting positions. Downstream of softening, the membranes separated the precipitates from the liquid phase.



03 / RESULTS

Permeate met site discharge requirements

The clarified permeate met the site's discharge requirements. The containerised installation kept the treatment platform transportable.

- Existing module mounts reused
- Transportable treatment unit

Separation after softening

→ Precipitates
UF retentate

→ Clarified water
UF permeate

ENGINEERING PROJECT

Digestate ultrafiltration for ammonia recovery

Anaerobic digestion

Design feed flow	Feed suspended solids	Membrane area
30 m³/h	25 g/L TSS	1,145.6 m²

01

The challenge

At design flow, the digestate carries 750 kg/h of suspended solids. The ammonia recovery stage needs a clarified feed.

02

The solution

After screening, crossflow membranes retain solids. Permeate feeds the ammonia stripper, while concentrate leaves through a separate bleed line.

01 **Screening** → 02 **Crossflow UF** → 03 **Ammonia stripping**

03 / PROCESS DESIGN

4 ultrafiltration trains

The design distributes 32 PVDF modules across four trains. Each train has space for one more module to expand the filtration area.

- Outside-in filtration
- Permeate backwash
- Clean-in-place circuit

32 PVDF modules



4 trains × 8 modules

ENGINEERING PROJECT

External MBR for bakery wastewater

Food plant wastewater retrofit

UF design capacity	Equalisation volume	Bioreactor volume
3 m³/h	~60 m³	~60 m³

01

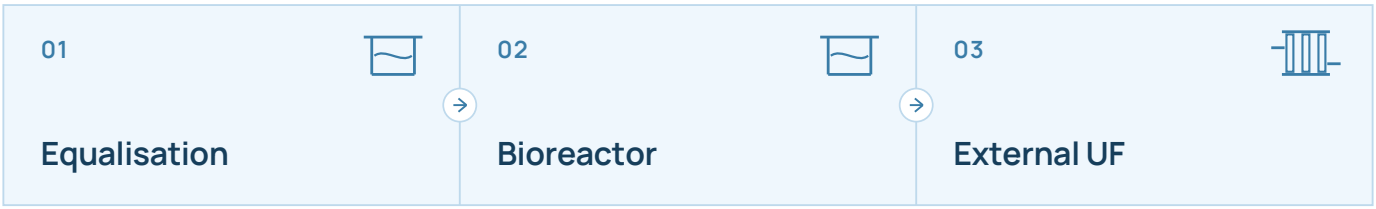
The challenge

Production washdowns deliver sharp peaks in organic load. The treatment plant needed to retain biomass and draw off treated water between settling cycles.

02

The solution

The first tank buffers the peaks. The second feeds an external UltraFlux™ loop that draws off permeate and returns the retained sludge to the reactor.



03 / PROCESS DESIGN

Two existing tanks

A separate nanobubble loop supplies oxygen to the bioreactor for the breakdown of soluble organic matter. It operates independently of permeate withdrawal.

- Automatic inlet filtration
- Oxygen-assisted aeration
- Permeate withdrawal without a settling stage

Process volumes

Equalisation
~60 m³

Bioreactor
~60 m³

ENGINEERING PROJECT

Reverse osmosis for acid whey concentration

Dairy processing · Yoghurt production

Design feed flow	Design daily feed	Design temperature
45 m³/h	900 m³/d	45 °C

01

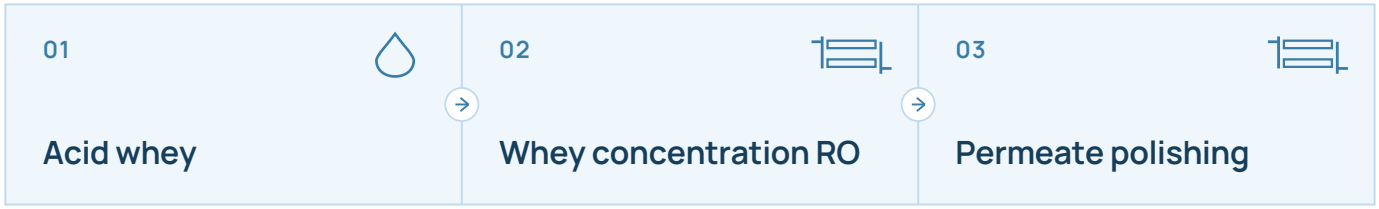
The challenge

Yoghurt production generates 900 m³ of pasteurised acid whey a day. The aim was to reduce the volume for disposal and recover water from the whey.

02

The solution

Reverse osmosis concentrates the whey in three recirculation loops. The design also includes a two-pass configuration for polishing the permeate.

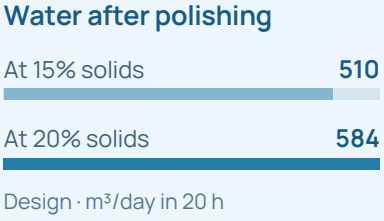


03 / PROCESS DESIGN

15% or 20% total solids

With polishing, the design balance gives 510 m³/day of recovered water at the 15% solids target and 584 m³/day at 20%, over 20 production hours.

- 48 or 60 main RO elements
- 25-element polishing stage
- Flow-based concentration control



ENGINEERING PROJECT

Ultrafiltration for water reuse in food processing

Biologically treated wastewater

Nominal capacity	UF membrane area	Permeate tank
10 m³/h	306 m²	5 m³

01

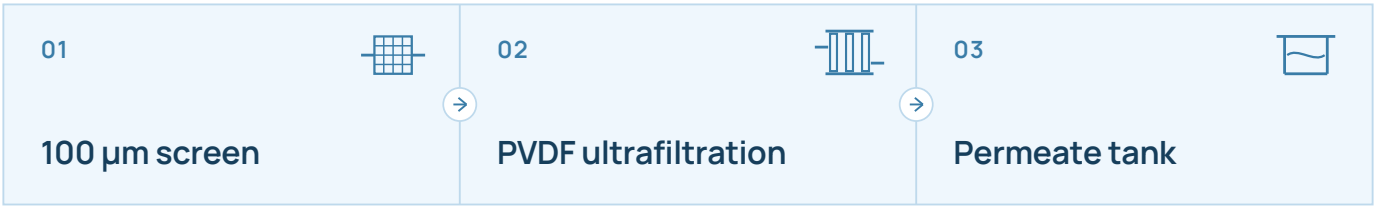
The challenge

The biologically treated effluent contains up to 14 mg/L of suspended solids. Removing the residual solids makes the water available for other uses around the plant.

02

The solution

A 100 µm self-cleaning screen protects six PVDF ultrafiltration modules. The modules operate in dead-end mode and deliver permeate to a service tank.

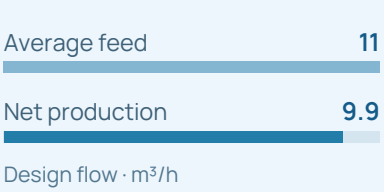


03 / PROCESS DESIGN

90% design recovery

Each cycle pairs 30 minutes of filtration with air scour, backwashing and rinsing. The net production figure accounts for the water used in backwashing.

- Irrigation
- Polymer make-up
- Animal housing washdown



ENGINEERING PROJECT

Water recovery from biogas digestate

Clarified digestate after ammonia stripping

UF feed	Feed conductivity	RO design recovery
15 m³/h	15 mS/cm	65–75%

01

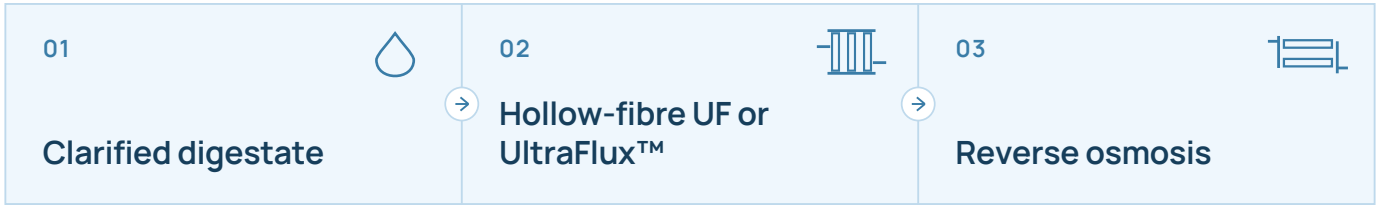
The challenge

Digestate from sewage sludge and pig slurry still contains solids and dissolved salts after ammonia stripping. The process is designed to recover water and reduce the reject volume.

02

The solution

One route combines microporous separation and hollow-fibre UF ahead of reverse osmosis. The other feeds the clarified digestate directly to an UltraFlux™ crossflow unit upstream of the same RO stage.

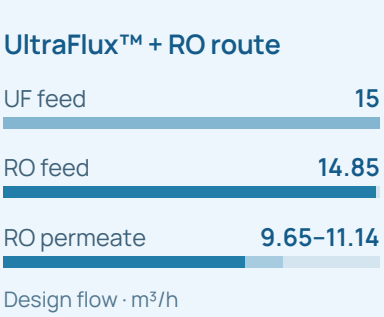


03 / PROCESS DESIGN

9.65–11.14 m³/h final permeate

In the UltraFlux™ layout, the design balance delivers 14.85 m³/h of filtrate to the RO stage. Final permeate represents 64.4–74.3% of the initial feed.

- 92% design recovery across hollow-fibre UF
- 99% design recovery across UltraFlux™ UF



ENGINEERING PROJECT

Nutrient concentration in pig slurry

Biologically treated liquid fraction

RO design feed	UF modules	RO elements
10 m³/h	6	15

01

The challenge

After nitrification and denitrification, the liquid fraction of the slurry contains 10 g/L of suspended solids. Removing them prepares the stream for reverse osmosis and concentration of dissolved nutrients.

02

The solution

Crossflow UF sends filtrate to the RO stage and returns the retentate to the slurry tank. A 5 µm cartridge filter protects 15 RO elements arranged in five pressure vessels.

01	02	03
Biological treatment	UltraFlux™ crossflow UF	Reverse osmosis

03 / PROCESS DESIGN

65% RO design recovery

The UF stage is sized to concentrate suspended solids from 10 g/L in the feed to 40 g/L in the return stream. The RO stage splits the filtrate into two streams with separate outlets.

- Separate UF and RO containers
- Integrated cleaning for both stages

RO water balance



Permeate	6.5 m³/h
Concentrate	3.5 m³/h

Design feed · 10 m³/h