BLUE FOOT
unbreakable membranes ™

HOW CARLSBERG HALVED WATER USE
THROUGH INDUSTRIAL WATER REUSE



END CUSTOMER
Carlsberg

LOCATION
Fredericia, Denmark

SECTOR
Food & Beverage - Brewery

OEM PARTNER
Pantarein Water

APPLICATION
New Build

KEY WINS

90%
of process water recycled

500+ million litres
of water saved annually

2.9 → 1.4 L
water per litre of beer

THE CHALLENGE

Making water circular in brewing

Carlsberg is an international brewing group. Its brewery in Fredericia, Denmark, produces beer and soft drinks and serves as a demonstration site for water recycling technology that can support wider implementation across the group.

Water is essential to brewing, both as a product ingredient and for cleaning production equipment. Reducing the amount of fresh water required therefore means finding ways to recover and reuse process water without compromising its quality.

As part of its Together Towards Zero programme, Carlsberg set out to halve water use across its breweries. At Fredericia, water recycling and energy recovery were brought together in one integrated treatment installation.

The Fredericia project brought together businesses, technical experts, and health and food authorities through the Danish DRIP partnership, focused on resource and water efficiency in industrial food production.

Carlsberg partnered with Pantarein to develop the water treatment installation. Pantarein selected **BLUE FOOT**'s IPC® ultrafiltration membranes for the aerobic membrane bioreactor. The membranes separate treated water from the biological sludge, providing feed water for downstream purification and reuse within the brewery.

The complete treatment process produces water of drinking-water quality for cleaning production facilities. The recovered water is used for these process applications rather than as an ingredient in beer.

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FROM WASTEWATER TO REUSABLE PROCESS WATER

THE SOLUTION

01 **Anaerobic treatment and energy recovery**
Wastewater first enters an upflow anaerobic sludge blanket (UASB) reactor. Organic matter is broken down and biogas is recovered for energy production.

02 **Aerobic treatment and membrane filtration**
The partially treated wastewater then enters an aerobic membrane bioreactor (MBR). **BLUE FOOT**'s IPC® membranes separate treated water from the biological sludge, retaining suspended solids and providing filtrate for further purification.

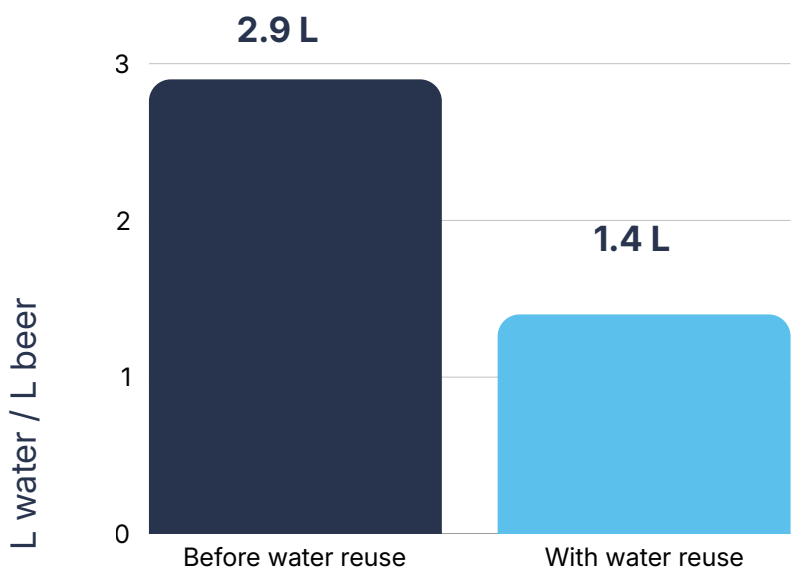
03 **Further purification for reuse**
Reverse osmosis and UV treatment further purify the MBR filtrate for reuse within the brewery, including cleaning production facilities.



48 membrane modules | 24 stacks of 2
Total membrane filtration capacity: 100 m³/h

Water savings with wider impact

Water use per litre of beer



More than 500 million litres of water saved annually

BLUE FOOT's role in water reuse

BLUE FOOT's IPC® membranes combine a membrane layer cast directly into a 3D woven textile support with a backwashable design. This reinforced construction provides mechanical strength, while backwashing helps control fouling and maintain filtration performance.

At Fredericia, the membranes provide feed water for downstream reverse osmosis, supporting the brewery's water reuse process.

THE RESULT

> By March 2023, Carlsberg estimated savings of **almost 1 billion litres of water** after approximately two years of operation. With **BLUE FOOT** membrane filtration as a key step in Pantarein's treatment system, Fredericia demonstrates the potential of industrial water reuse at brewery scale.