

THE LEADER IN TUBULAR MEMBRANES

Project Reference - MBR

Holland Malt

www.berghofmembranes.com



Membranes
Think outside the box

Berghof Group

Your Innovation Hub

Fluoroplastics

Products +
Instruments

Membranes

Analytics

Environmental
Engineering

Testing

Automation
and
Control
Solutions

Process
Management

Berghof Membranes

Think Outside the Box

Berghof Membrane Technology GmbH, part of the Berghof Group, is the leading manufacturer of tubular membranes for the filtration and separation of process streams and wastewater for industrial applications.



BERGHOF

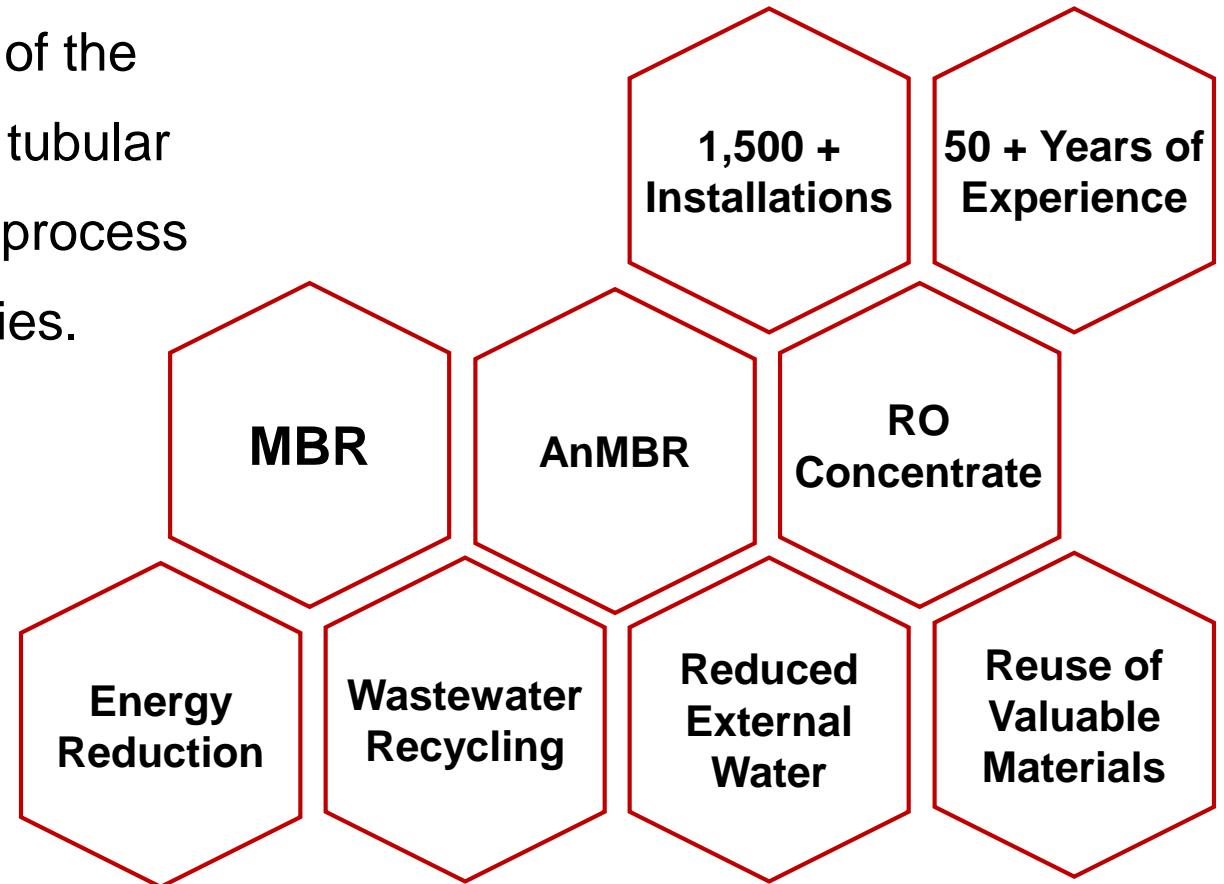
Membranes

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Holland Malt: The Customer

World-renowned since 1938 – Eemshaven, Netherlands



Plant Profile Eemshaven, Netherlands

Plant Profile

- 170,000t - Barley
- 140,000t - Malt
- Annual Consumption:
 - 9,000,000 m³ gas
 - 20,000 MWh
 - 510,000 m³ water

Plans to double capacity



Holland Malt Expansion

Pilot Test

Berghof B-SMART®
Concept Simulation

Alternative Tubular UF

Criteria:

- Energy consumption
- Sustainability
- Reliability
- Maintenance / checks
- Investment



External Filtration System

Why B-SMART®:

- Reduced energy consumption:
0.4 – 0.6 kWh/m³
- Superior fouling control
- System reliability and flexibility
- Easier maintenance
- Lower capital investment



Holland Malt Expansion

UF Design

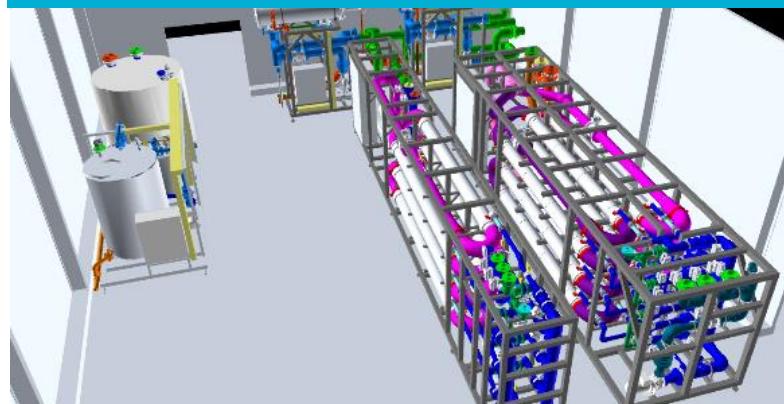
SINGLE LOOP

- Footprint: 12.5 m²
- Pump: max. flow: 288 m³/h (CFV 3 m/s)
max. power: 37 kW (CFV 3 m/s)

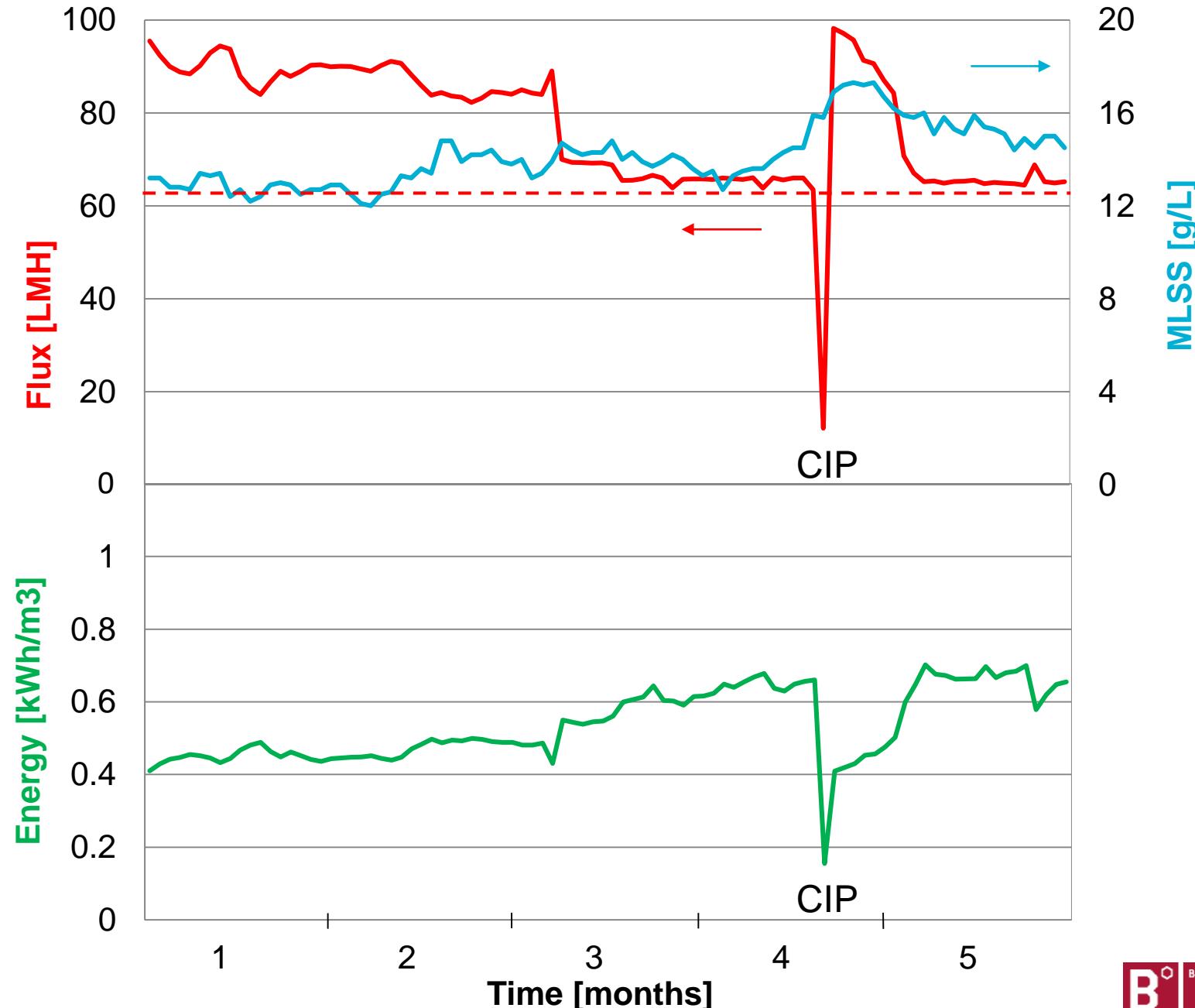
DOUBLE LOOP

- Footprint: 19.14 m² (w/o pump)
23 m² (with pump)
- Pump: max. flow: 576 m³/h (CFV 3 m/s)
max. power: 73 kW (CFV 3 m/s)

STAINLESS STEEL FRAME



System Performance



Holland Malt

UF Permeate Quality

Monitoring permeate on:

- PO₄-P
- NH₄-N
- NO_x-N (sum NO₂- and NO₃-)
- Turbidity - if detected, auto-shutdown UF-system



	REGULATION					RESULTS		
	ADWG	US (EPA)	Europe	NL	WHO	DW NL	permeate	units
1 Turbidity	<5	<0.3	n.a.	n.a.	<1	<0,1	0,02	NTU
2 pH	6,5-8,5	6,5-8,5	6,5-9,5	7,5-8,5	6,5-8,5	7,6	7,5	pH
3 Chloride	<250	<250	<250	<150	<250	44	160	mg/l
4 Sulfate	<250	<250	<250	<150	<500	16	28	mg/l
5 Ammonia	<0,5	n.a.	<0,5	<0,5	n.a.	<0,03	0,05	mg/l
6 Nitrite	<3	<1	<0,5	<0,1	<3	<0,016	<0,016	mg/l
7 Nitrate	<50	<10	<50	<50	<50	0,7	4,6	mg/l
8 Aluminium	<200	<200	<200	<200	<100	<5	<5	µg/l
9 Antimony	<3	<6	<5	<5	<20	<0,5	<0,5	µg/l
10 Arsenic	<10	<10	<10	<10	<10	<0,5	<0,5	µg/l
11 Boron	<4000	n.a.	<1000	<1000	<2400	21	7	µg/l
12 Cadmium	<2	<5	<5	<5	<3	<0,05	<0,05	µg/l
13 Chromium	<50	<100	<50	<50	<50	<0,5	0,8	µg/l
14 Copper	<1000	n.a.	<2000	<2000	<1000	<2	3	µg/l
15 Mercury	<1	<2	<1	<1	<6	<0,02	<0,02	µg/l
16 Lead	<10	n.a.	<10	<10	<10	<0,5	<0,5	µg/l
17 Manganese	<0,1	<50	<0,05	<50	<4	<0,002	0,007	mg/l
18 Sodium	<180	n.a.	<200	<150	<200	24	60	mg/l
19 Nickel	<20	n.a.	<20	<20	<70	<0,5	0,6	µg/l
20 Selenium	<10	<50	<10	<10	<40	<0,5	<0,5	µg/l
21 Iron	<0,3	<0,3	<0,2	<0,2	<0,3	<0,01	0,36	mg/l
22 Zinc	<3000	<5000	n.a.	<3000	n.a.	3	41	µg/l
23 Fluoride	<1,5	<4	<1,5	<1,5	<1,5	0,13	0,13	mg/l
24 Cyanide	<80	n.a.	<50	<50	<80	<1	2	µg/l
25 Bromate	<20	n.a.	<10	<1	<10	<0,5	<0,5	µg/l
26 Colour	none		none		none	none	yes	
27 Odour	none		none		none	none	yes	

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Service and Support Programs



Tubular UF
Membrane Modules



B^oSMART[®]

Intelligent Software &
Engineered Systems



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