

## Beer Membrane Filtration

Beer Membrane Filtration is a proven technology and feasible alternative from both a quality and cost point of view. Norit Process Technology offers a range of filters which are tailored into optimal filtration solutions for each individual brewery. From compact skid mounted units for small breweries to turn-key filter line concepts for medium-sized and large breweries, Norit Process Technology has the application know-how to take your brewery into the future.



## Hygienic Valves and Valve Manifolds



Norit Súdmo valves feature highly finished, non-porous surfaces, a long working life and tolerance to aggressive mediums, and are ideal wherever strict sanitary conditions must be maintained.



## Total CO<sub>2</sub> and O<sub>2</sub> Management

Carbon dioxide (CO<sub>2</sub>) has a large influence on the beer quality and customer acceptance of the product. CO<sub>2</sub> treatment, control and dosing are of fundamental importance and should be seen as a total concept of which CO<sub>2</sub> recovery plays a key role. Norit Haffmans offers solutions for every situation. Advanced LO and HLP CO<sub>2</sub> recovery systems secure purity levels of 99.998%. With the HRS LiquiVap technology, energy cost reductions by up to 60 percent are achieved.



Since excess O<sub>2</sub> can compromise flavor stability and lead to significantly reduced product shelf life, measuring the O<sub>2</sub> content in beer and beverages is an essential quality control aspect during and after production.

Norit Haffmans covers every aspect of CO<sub>2</sub> and O<sub>2</sub> management in the brewing and beverage production:

- CO<sub>2</sub> and O<sub>2</sub> control in CO<sub>2</sub> gas from recovery
- CO<sub>2</sub> recovery plants & accessories
- CO<sub>2</sub> analysis service (CAS), CO<sub>2</sub> audits, and quick scans
- Water deaeration
- Carbonation and 'bubble-free' dissolving of CO<sub>2</sub> in liquids
- In-line and at-line CO<sub>2</sub> and O<sub>2</sub> control and measurement during production
- Measurement of CO<sub>2</sub> and O<sub>2</sub> in the final product, filled in bottles, tanks or kegs

## Quality Control

In addition to CO<sub>2</sub> and O<sub>2</sub> our quality control equipment covers foam and turbidity measurement and the monitoring of processes such as pasteurization and bottle/keg washing.



## Water Treatment and Re-use

Norit's MBR is a compact-built purification system combining the biological degradation step with a membrane separation step. The influent is fed to the aerated bio-reactor where the organic components are oxidized by the activated sludge. Next, the aqueous activated sludge solution passes through a membrane filtration unit separating the water from the sludge. The latter returns to the bio-reactor, while the permeate is discharged or re-used as particle-free effluent.



## Sterile Water Filtration

The Aqua Membrane Filtration system (AMF) is a compact sterile filtration system, which is designed to be sterilized with steam or sanitized with hot water. The fully automated 'plug & play' unit can be applied in the pharmaceutical, food and beverage industries for fine filtration of raw water.



## Norit does more than Brewing

### Solutions for other Beverage Industries

- Wine (activated carbon for de-colorization & membrane filtration)
- Distilleries (Total CO<sub>2</sub> & O<sub>2</sub> Management, valves & water treatment)
- Juice (activated carbon for de-colorization & membrane filtration)
- Soft drinks (valve & mixing technology, turnkey systems & QC equipment)
- Mineral Water (valve & mixing technology, turnkey system, membrane filtration & water treatment)
- Green tea and flavored ice tea (valve & filtration technology)



### Activated Carbon

Food grade carbons are successfully applied in any scale of operation, from large bottling plants to small wineries for the de-coloring of the beverage.



## Norit 'leading in purification'

### Who we are

Norit, headquartered in Zenderen, The Netherlands, is an innovative leading supplier to the water and beverage industries. With almost a century of experience, the Norit Group supplies consumables, components, systems, and solutions, based on proprietary technology for every step of the water and beverage value chain. More than 8 percent of the world's population – over half a billion people – is already consuming water purified by Norit!

Norit's activated carbon, membranes, pumps, aseptic and hygienic valves, carbon dioxide systems, and quality control equipment rank among the world's best. Norit offers global coverage with production, engineering and manufacturing facilities in seven countries, and a network of dedicated Norit sales and service centers, business partners and distributors which serve customers in more than 150 countries around the world.

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# Brewery of the Future

## State-of-the-art Brewing Technology

Norit's extensive experience in beverage technology is combined in Norit's Brewery of the Future. All of Norit's know-how and state-of-the-art technologies including Norit Südmo hygienic valves, Norit Haffmans Total CO<sub>2</sub> and O<sub>2</sub> Management and Norit's revolutionary Beer Membrane Filtration are combined into the most advanced and sustainable brewery concept that meets the highest quality requirements and economic and environmental standards. Thanks to Norit's Membrane BioReactor for wastewater treatment, water consumption is lowered to a world record of 2 liters of water for 1 liter of beer.

## Customer Requirements

- Brewing requirements:**
  - Highest and consistent beer quality
- Environmental requirements:**
  - Minimized disposals (no kieselguhr)
  - Minimized utility consumption
  - Reduced product losses
- Economical requirements:**
  - Increased production flexibility
  - Decreased logistical costs
  - Minimized raw material and utility consumption and maintenance

## Norit Scope of Supply

- Yeast propagation and yeast storage
- Beer Membrane Filtration (BMF)
- Carbo controller and blender
- Water deaeration
- Beer recovery from surplus yeast
- Fermenting green beer cooler
- Bright beer tank area
- Hygienic valves and valve manifolds
- Total CIP from brewhouse to bright beer tank
- Full automation and Scada system (MES/ERP integration)
- Water treatment incl. Membrane Bio-Reactor (re-use)
- CO<sub>2</sub> recovery and HRS LiquiVap
- Quality control equipment (TLS)

## Design Philosophy

- In order to meet all customer requirements Norit implements the following engineering principles:
- Focus on today's key performance indicators: raw materials, energy, water, labor, and sustainability
  - Brewhouse and beer process plant in one room
  - Fermentation area in closed and dry room
  - Continuous flow in brewhouse and beer processing plant resulting in compact dimensions for equipment, piping and utilities

## Benefits

### Sustainability & Total Cost of Ownership

- Beer Membrane Filtration to ensure DE-free filtration and improve taste and physical chemical stability
- High gravity brewing and blending
- Optimal logistics in packaging, warehousing and on-site transportation
- Maximized recovery and use of CO<sub>2</sub> from fermentation
- Minimize utility consumptions and maintenance
- Re-use of wastewater in order to minimize water consumption to 2 hl of water for 1 hl of beer
- Consistently high quality beer
- Improved taste stability
- Environment-friendly production
- Minimum labor (2 FTE/shift)
- Minimum beer losses
- Low consumption of raw materials, energy & water
- Lowest Capex and Opex
- Lowest Total Cost of Ownership

