

Industrial effluent treatment and end-of-pipe water recycling

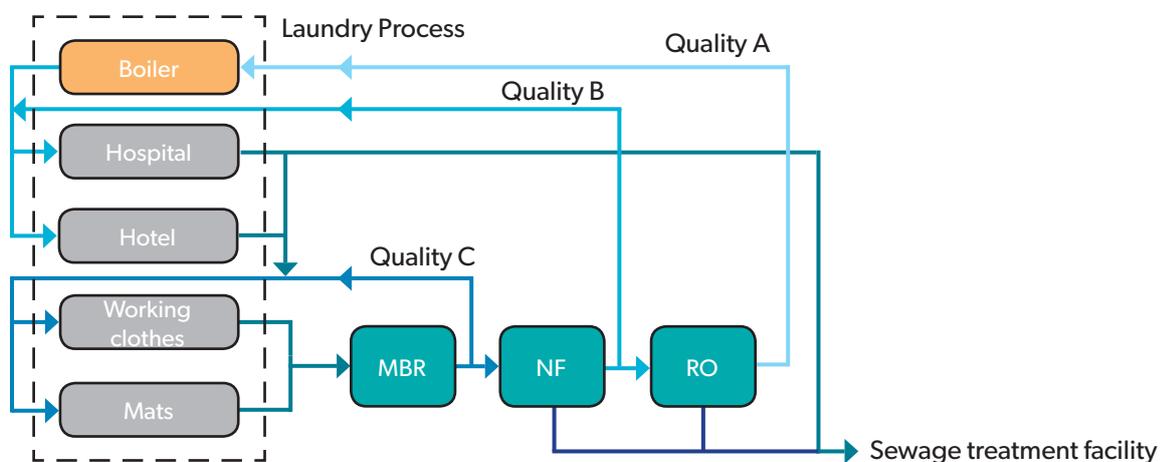
To save costs for fresh water and effluents, industrial laundries have installed many internal water cycles. These measures have helped to significantly reduce the specific water consumption. To further reduce the water costs, wastewater instead of being discharged can be recycled as process water.

Membrane separation plants eliminate organic and inorganic substances and avoid their accumulation in the cycle. Due to the link between the quantity of laundry detergent, the laundry detergent substances and the degree of pollution, the membrane process must be adapted to the individual laundry process. In industrial laundries, which do not have a biological pretreatment, a membrane plant can

very easily be upgraded. Additionally to the saving in water consumption, profitability is further increased by the reduction of water softening agents and a minimized energy demand.

Especially in the textile industry, effluent decolourization is also an important aspect.

WEHRLE has a wide range of experience and technologies in the field of water purification and effluent treatment and is able to use tailor-made processes or process combinations. Our focus lies on providing the best technological solution achieving the highest economic viability for the customer.



Overview Process Technologies

UF / NF / RO Membrane technology	e.g. for closing water cycles for any degree of purity, retention of colour pigments and the demineralization of process water and boiler feed water
BIOMEMBRAT® High-performance-MBR	Versatile, robust and odorless biological treatment technology for highly loaded wastewaters with upgrade option for recycling
BIOSTREAM® Loop reactor	Energy-optimized biological treatment for the depollution of highly loaded wastewaters and in case of extremely limited space

Separation of Water Substances Using Membrane Technology

Wastewater from the textile industry contains different textile additives, colour pigments and textile basic chemicals. By using different membrane types, it is possible to remove certain substances – for the recovery of recyclable materials, for emulsion separation, wastewater treatment or water recycling.



For example **Clariant, Gersthofen / DE** – The nanofiltration plant separates the nitrous additives from the process water to be disposed of separately and to save costs.

Flow rate	20 m ³ /d
Inlet / N bound	2,000 mg/l
Outlet / N bound	< 400 mg/l
Performance	> 80 %

Biological Treatment of Effluents from the Textile Industry

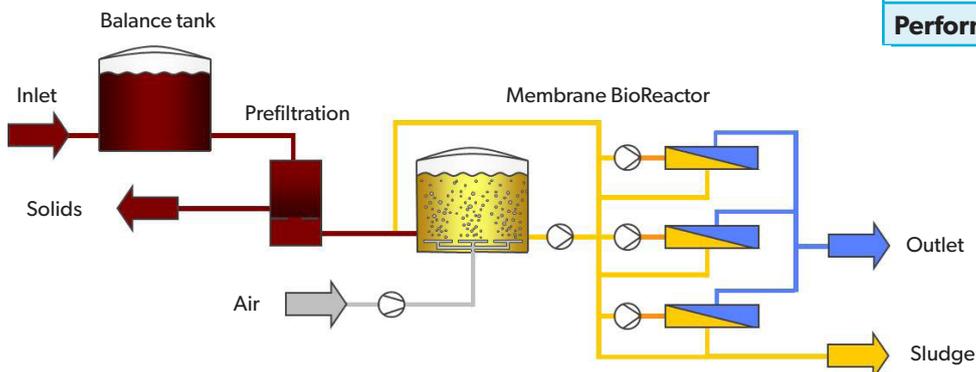
In some cases, for example treating additives from the textile industry, it may be more economic to eliminate the organic compounds instead of separating them.

A very economic method is the biological elimination using a high-performance Membrane Bioreactor containing specialized microbes. Due to its high efficiency and the related compact construction, this technology could even be integrated in existing buildings. The biological elimination of pollutants significantly reduces the wastewater disposal costs and could serve as pretreatment step for water recycling.



For example **TEXTILCOLOR AG, Sevelen / CH** – Wastewater treatment by using a BIOMEMBRAT® high-performance MBR with pressure biology for optimized oxygen transfer.

Flow rate	29 m ³ /d
Inlet / COD	10,000 mg/l
Outlet / COD	< 800 mg/l
Performance	> 92 %



Combined Biological Effluent Treatment with Water Recycling

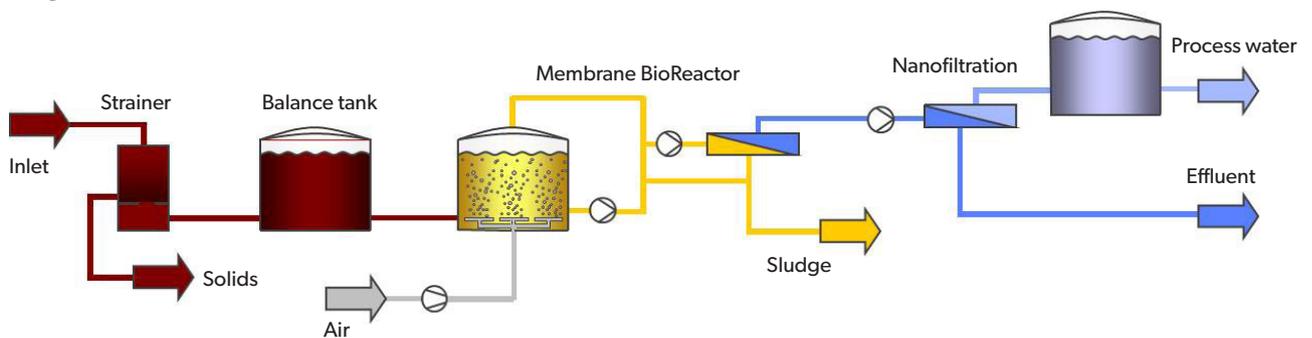
Depending on the type and origin, laundry wastewater can contain different oils, greases, halogens, salts, metals, minerals, surface-active substances, etc. To comply with the discharge limits, a reliable and efficient wastewater treatment technology is required.

For this purpose, WEHRLE uses the proven BIOMEMBRAT® high-performance MBR. A particular advantage of this technology is that it can be easily upgraded for water recycling.

For example **ALSCO Berufsbekleidungsservice GmbH, Kaiserslautern / DE** – Treatment of laundry wastewater by using a BIOMEMBRAT® high-performance MBR with nanofiltration as tertiary treatment step: clean, warm (> 35 °C), soft water, which becomes available for the entire laundry process. The concentrate retained by the nanofiltration can be discharged as normal wastewater in an economic way since the pollutants have already been eliminated in the biological stage.



Flow rate	80 m ³ /d
Inlet / COD	4,000 mg/l
Outlet / COD	< 100 mg/l
Performance	> 99 %
Recovery rate	> 80 %

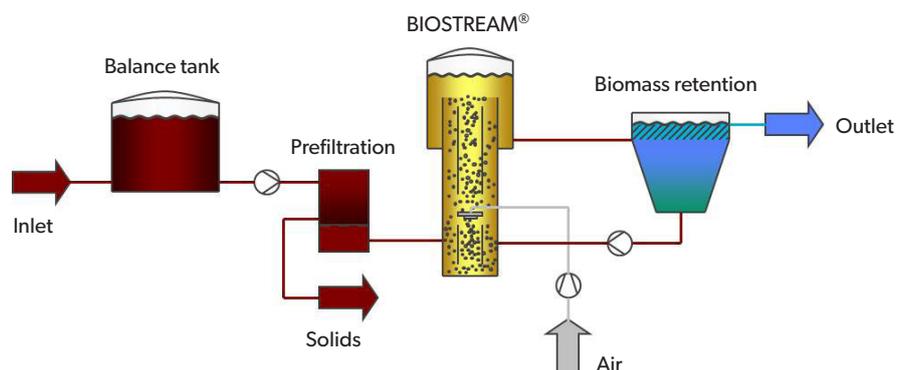


BIOSTREAM® - the Energy-Efficient and Compact Alternative

For clients who have not installed a biological wastewater treatment plant because of space limitations or high energy cost for aeration, WEHRLE offers the BIOSTREAM® process technology which reduces the operation costs to a minimum by using an energy-optimized aeration technology. Due to the compact Bioreactor design, the BIOSTREAM® is suitable also in case of extremely limited space.

For example **CWS-boco Laundry and Hygiene Service Co. Ltd., Shanghai / CN** – Laundry wastewater treatment in extremely limited space – possible due to the high oxygen injection and the high efficiency of the aerobic BIOSTREAM® loop reactor.

Flow rate	600 m ³ /d		
	Inlet	Outlet	Performance
COD	1,200 mg/l	< 300 mg/l	> 75 %
NH₄-N	30 mg/l	< 5 mg/l	> 83 %



Complete Systems and Service Packages from One Source

WEHRLE's approach developing the plant concept ensures, that all aspects are considered - from suitable and aligned pretreatment technologies, the consideration of internal production processes and shutdown periods, the inclusion of existing assets into the design, as well as a modern plant automation, which allows to subcontract the plant operation.

As additional services, we offer concept development and feasibility studies to identify the right process technology for a specific wastewater or to upgrade an existing installation, laboratory tests and on-site pilot trials, and open-ended consultancy comparing different treatment options for the client.



WEHRLE Umwelt GmbH

Plant engineering and services from one source

Since 1982, WEHRLE sets benchmarks as pioneer and technology leader for the treatment of very difficult and complex wastewater. The wide range of available process technologies allows intelligent process combinations to fulfil the requirements and expectations of the client in the best possible way. WEHRLE consults, plans and builds plants and also offers corresponding services such as piloting, efficiency optimization and retrofit of existing plants.

Especially for applications in the industry also factors beyond the used technology are important: a reliable performance in case of possible variations of wastewater volume and loads in the industry (e.g. caused by seasonal production or changes of product lines) and by all climate conditions, as well as a modular design for future upgrades of the production and easiest operation, to enable a simple outsourcing of the plant operation. The stable high effluent quality of WEHRLE plants allow an easy, optional upgrading, e.g. to use the treated water for reu-

se / recycling and therefore, to save costs for process water, heat energy and possible softening.

WEHRLE is dedicated to the company's history: As family-owned company reliability, longevity and openness with clients and partners are our top priorities. The clients of WEHRLE trust in this philosophy – in over 40 countries and on 5 continents.

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Company video