DRINKING WATER PRODUCTION

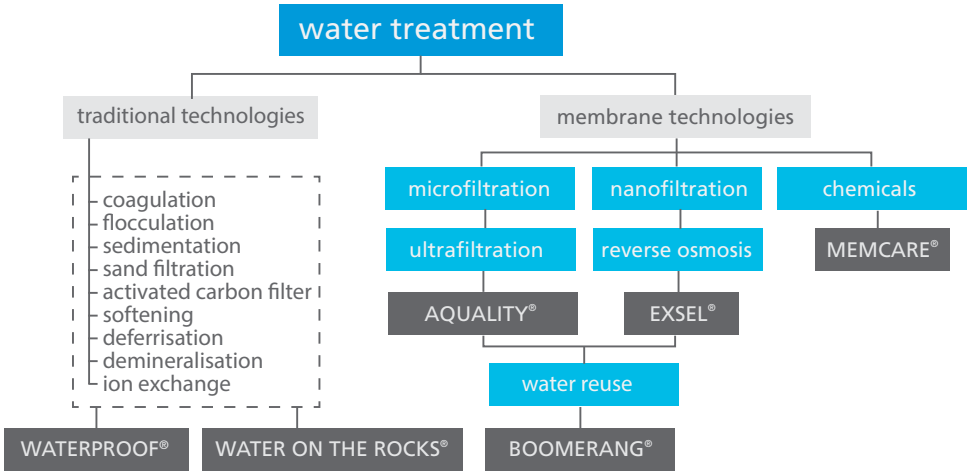
WATERLEAU

protecting the 4 elements

DRINKING WATER PRODUCTION

Waterleau uses both traditional as well as membrane technologies for the production of safe drinking water.

Traditional technologies, that are brand named WATERPROOF®, include the typical drinking water treatement techniques based on cascade aeration, coagulation, flocculation, decantation, sand filtration and activated carbon filtration, but they also include specific treatment techniques such as softening, iron removal, demineralisation and ion exchange. Under membrane technologies we understand micro- and ultrafiltration (AQUALITY®) as well as nano-filtration and reverse osmosis (EXSEL®). Waterleau also supplies MEMCARE® chemical cleaning agents to guarantee a long membrane lifetime to its clients. Waterleau also has a full range of mobile containerized installations which can be used for emergency drinking water supply (WATER-ON-THE-ROCKS®). When drinking water is being produced by recycling biologically treated effluent that is polished by ultrafiltration and reverse osmosis Waterleau applies its proprietary BOOMERANG® water approach.



WATERPROOF®

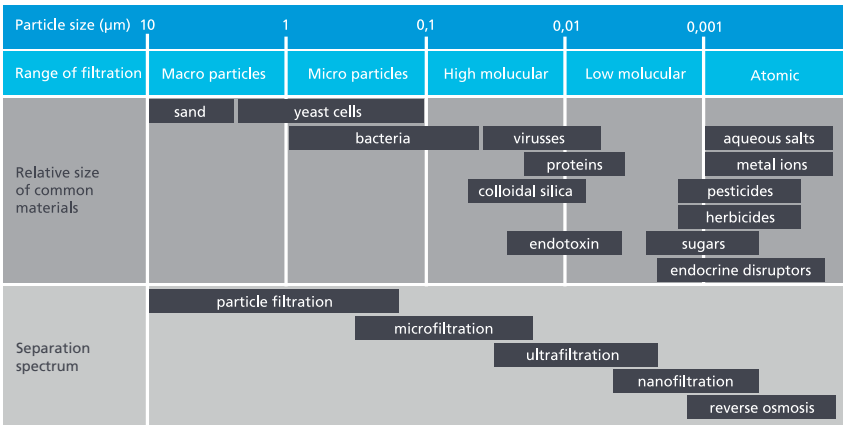
WATERPROOF® installations typically contain following process steps : cascade aeration, splitter box, coagulation, flocculation, lamella decanter and sandfiltration. The particularity of WATERPROOF® however, is that it integrates all these process steps into a single civil structure.

Doing so the WATERPROOF® drinking water production plant is much more compact compared to conventional drinking water plants. An additional advantage is a significant cost saving due to a reduction in the amount of interconnecting piping and electrical cabling, but especially as a result of the lower cost of the civil works, using common walls. It also allows the water treatment plant to be covered, hence achieving a perfect integration in its environment.

WATER-ON-THE-ROCKS®

Waterleau has developed a full range of emergency drinking water installations, completely mounted in containers and allowing a quick mobilisation. These units can also be used in countries where civil works are difficult, slow or expensive and hence are the limiting factor of an urgent drinking water supply.

WATER-ON-THE-ROCKS® comes in different sizes ranging from 500 m³/d in a single container to 20,000 m³/d in a completely containerized drinking water plant built in multiple containers. In that way WATER-ON-THE-ROCKS® is able to provide safe drinking water to 400,000 people (at 50 l/PE.day) in a few days time.



AQUALITY® ULTRAFILTRATION

Ultrafiltration (UF) membranes provide a physical barrier to remove bacteria, suspended solids and harmful pathogens such as Giardia and Cryptosporidium. The resulting water quality is characterized by a low turbidity and SDI value and is suitable for direct feeding to a downstream RO installation. The applied membrane type for UF membranes is usually a hollow fiber membrane. These membranes can be used in an inside-out as well as in an outside-in configuration.

UF is a pressure-driven filtration process in which particulates, colloids, and macromolecules are separated from a liquid feed stream upon passage through a membrane.

The separation is based primarily on the size of the species in the liquid relative to the size of the membrane pores (simple sieving process). In UF, small molecules such as water, mono-saccharides and all ionic species pass through the membrane while larger molecules, colloidal particulate matter, bacteria, emulsified oils and fats are retained.

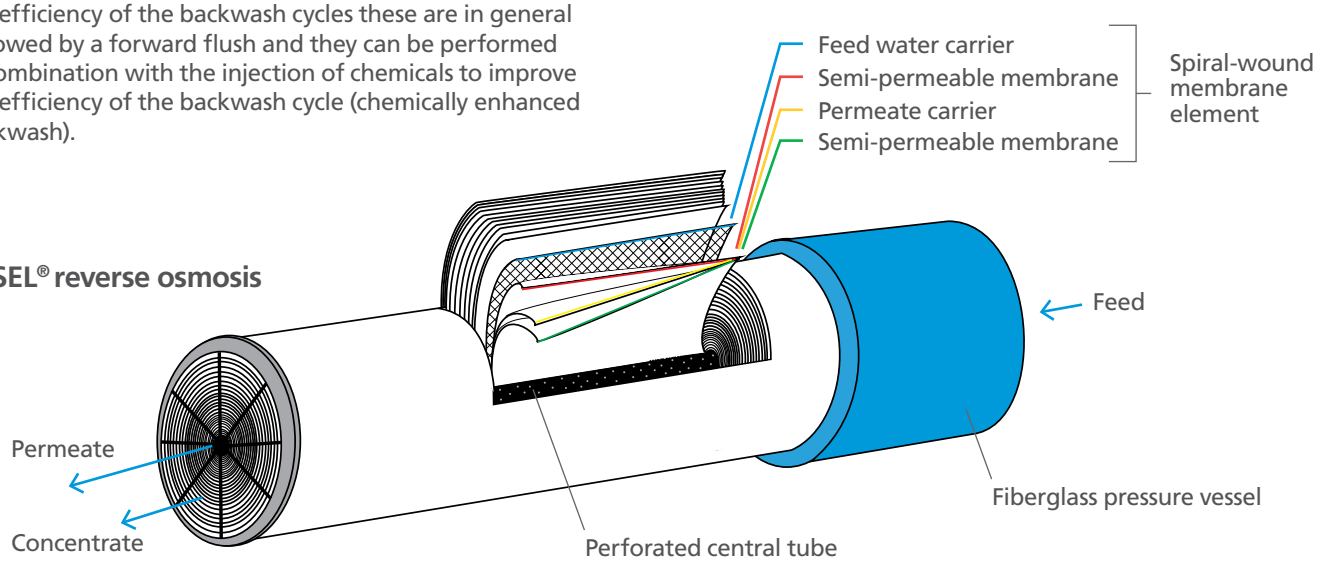
Backwashing is typically performed every fixed interval, during which the flow direction inside the membranes is reversed for a short period of time, This is used to remove most of the suspended solids layer that has built-up on the feed side of the UF membrane. In order to improve the efficiency of the backwash cycles these are in general followed by a forward flush and they can be performed in combination with the injection of chemicals to improve the efficiency of the backwash cycle (chemically enhanced backwash).

EXSEL® REVERSE OSMOSIS

Reverse osmosis (RO) is a cross-flow filtration using high pressure spiral wound fouling resistant membranes. The transport of water through the membrane is mainly by means of diffusion through the membrane.
A high rejection RO membrane is a thin film composite membrane consisting of three layers: a polyester support web, a micro porous polysulphone interlayer, and an ultra thin polyamide barrier layer on the top surface.

The flat sheet membranes are being rolled up around a permeate tube in order to form a spiral wound element. In membrane systems the elements are placed in series inside of a pressure vessel. The concentrate of the first element becomes the feed to the second element and so on. The permeate tubes are connected with interconnectors and the combined total permeate exits the pressure vessel at one side of the vessel while the concentrate can be fed to another stage.

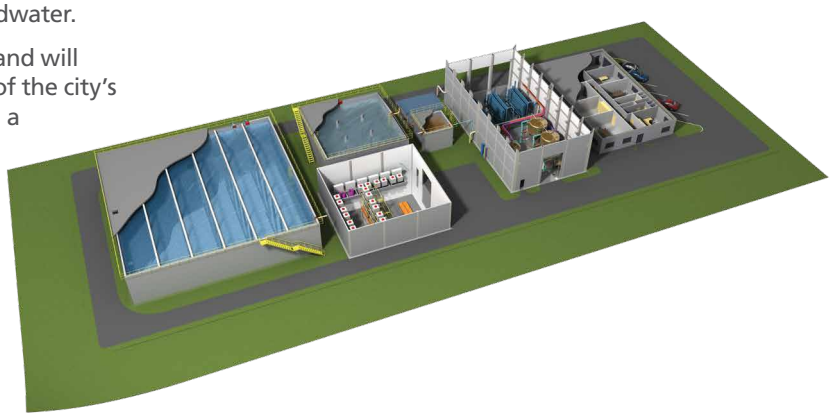
EXSEL® reverse osmosis



EXSEL® CASE: DESALINATION FOR MADINATY, EGYPT

The new city of Madinaty, a private development of the Talaat Mustapha Group near Cairo in Egypt, is relying on Waterleau for its drinking water production. Waterleau had been retained for the design and construction of an EXSEL® desalination plant starting from brackish groundwater.

The total capacity of the plant is 10,000 m³/day and will serve up to 100,000 inhabitants in a first phase of the city's development. The treatment scheme comprises: a borewell intake at 250m depth, a multimedia filtration step and an EXSEL® reverse osmosis installation.



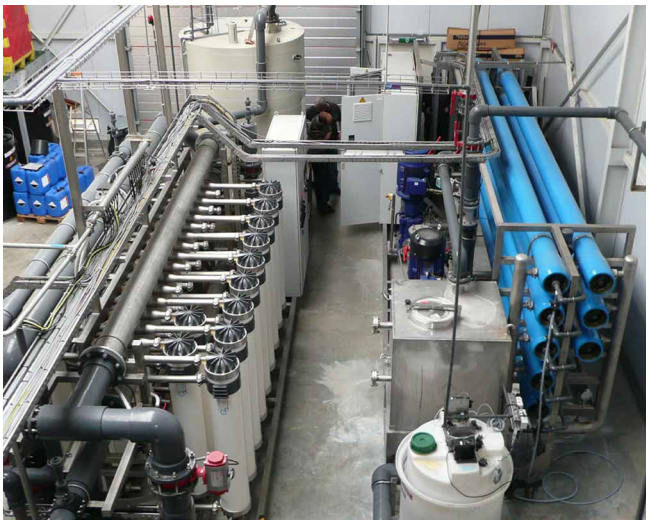
BOOMERANG® CASE: POTABLE WATER FROM BIO-EFFLUENT

Before applying the water reuse scheme, Farm Frites Lommel (Belgium), a potato processor specialized in deep frozen fries and a variety of potato specialties, was relying on groundwater and drinking water supplies for its production process. These water supplies are getting less

attractive due to the fact that the groundwater permits are subject of discussion (hence their future availability is uncertain), the costs of the drinking water supplies tend to increase as well as the costs of wastewater discharge.

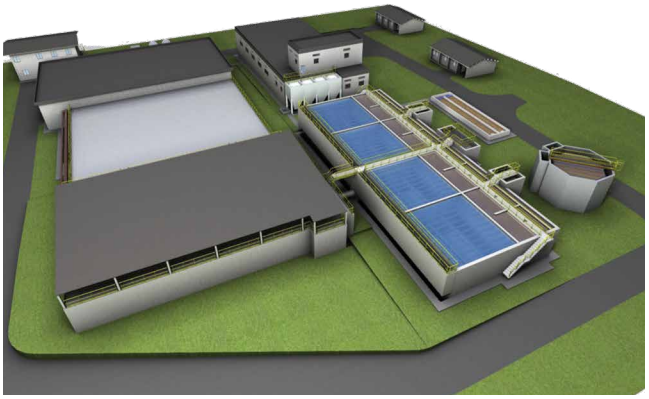
Today's available techniques for wastewater reuse have become broadly accepted and have become economically viable. Biological effluent is a stable and readily available source for feeding to the water reuse installation. With the integration of the water reuse installation, the amount of wastewater discharged as well as the drinking water and groundwater intake can decrease substantially.

The combination of an AQUALITY® ultrafiltration and an EXSEL® reverse osmosis installation ensure that the produced water complies with the WHO regulations and the water is recycled, as potable water, in the factory. Waterleau realized this project in close collaboration with the municipal drinking water company, who is operating the plant and who guarantees the drinking water quality on a continuous basis.



WATERPROOF® CASES

DRINKING WATER FOR TSHIKAPA, DR CONGO

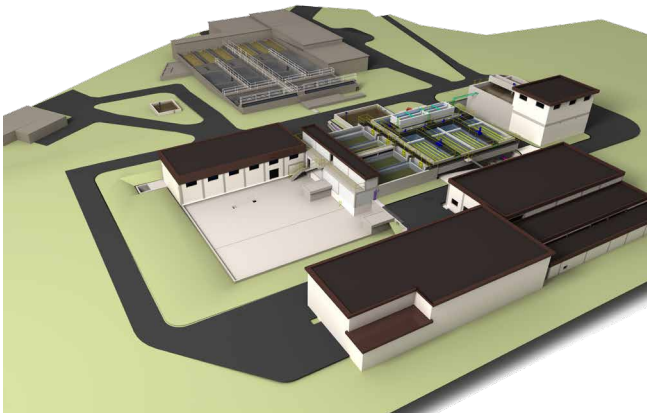


An estimated 51 million people in the Democratic Republic of the Congo (DRC) have no access to safe drinking water. The stark reality is that the DRC has one of the fastest urbanization growth rates in the world and this is not being matched with adequate water and sanitation service delivery. Therefore the African Development Bank and the DRC Government agreed on the design of a National Rural Drinking Water Supply and Sanitation (DWSS) Program. Tshikapa was selected as one of the key locations, for urgent drinking water supply and sanitation. Waterleau is currently constructing a WATERPROOF® drinking water system for the city of Tshikapa, which is located in the province of West Kasai. This plant will have a capacity of 50,000 m³/d and will supply 1 million people with clean and safe potable water. In the meanwhile Waterleau has installed a WATER-ON-THE-ROCKS® mobile drinking water plant to cover te immediate needs of 7200 people.

DRINKING WATER FOR KHEMISSET, MOROCCO

Morocco's Water Sector Activity Strategy (2008-2012) targeted a sustainable development of water supply facilities in both urban and rural areas. Within this context, the strengthening of the water supply facility of Khémisset had been put forward as one of the key projects. In order to facilitate its realization, the Japanese International Cooperation Agency (JICA) supplied a loan to Morocco's ONEE (Office National de l'Electricité et de l'Eau Potable).

The rural city of Khémisset and its surrounding villages, located along the popular Rabat-Fès axis, are developing very quickly. Its population is growing steadily from approx. 250.000 (2004) to approx. 400.000 inhabitants (2015). In order to meet the needs of this rapid population increase, the existing drinking water plant had to be upgraded with an additional capacity of 20.000 m³/day bringing the total capacity up to 54,400 m³/day



Waterleau's WATERPROOF® compact drinking water plant has been retained by ONEE as best technical and commercial solution. The plant consists of following treatment steps: cascade aeration, optional prechlorination, coagulation, flocculation, decantation, sand filtration and disinfection to ensure a safe and stable drinking water supply. Due to its compact nature, the WATERPROOF® drinking water plant could be constructed using only a minimum footprint.

DRINKING WATER FOR ABHA DAM, KINGDOM OF SAUDI ARABIA

From the Abha Dam to the water distribution network. Abha is the capital of Asir province in Saudi Arabia counting 250.000 inhabitants. A popular summer destination, drinking water needs increase during the season. In the Asir Mountains nearby, there are several dams permanently holding water. Aba has its own dam within the actual city limits acting as the source for the drinking water production.

Waterleau has built a WATERPROOF® low footprint drinking water plant providing 20,000 m³/day, situated near the city center. The plant is completely covered and ensures a zero nuisance to its environment. Due to its architectural design, it fits harmoniously in the neighborhood.

SAFE DRINKING WATER PRODUCTION FROM ANY SOURCE, ANYWHERE

DESIGN
ENGINEERING
CONSTRUCTION
OPERATION
MAINTENANCE

PROTECTING THE 4 ELEMENTS




We all have the responsibility to handle our natural resources in a careful and sustainable way. Waterleau develops environmental technologies and offers sustainable solutions for water, air and waste treatment, as well as for energy recovery. As an EPC contractor and operator, Waterleau counts more than 1000 references for municipal and industrial clients around the world.

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