Ultrafiltration technology in major projects: inge® showcases its water treatment expertise with examples of large scale projects across the globe

There is a growing awareness of the importance of professional drinking water treatment and eco-friendly methods of wastewater reuse and recycling – not just in arid regions, but worldwide. Against this backdrop, ultrafiltration (UF) has taken on an increasingly important role over the past 15 to 20 years in a broad range of water treatment applications.

As treatment plants get bigger, so too do the challenges involved in building and running them. As a result, the quality and reliability of their components has become a key factor, and comprehensive technical support from component suppliers has become a crucial part of successful plant engineering projects. inge® has achieved huge success in recent years by identifying and fulfilling those needs.

Multiple examples of large scale projects around the globe confirm that inge GmbH’s membrane technology has adopted a leading role in the UF market. The following reference projects are just a selection of the company’s recent achievements.

inge® references

- Ghana
- Philippines
- India
- KSA
- Singapore

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Accra, Ghana (Africa)

One of inge®'s first international lighthouse projects in the sea water treatment sector

Huge quantities of drinking water are required for the metropolitan area of the Ghanaian capital Accra. To meet these needs, a cutting-edge sea water desalination plant was officially opened about two years ago in Nungua Township, some 12 kilometers from Accra.

The plant uses reverse osmosis (RO) to produce 60,000 cubic meters of drinking water a day for around 500,000 people. Following a rigorous selection process, the plant contractor chose inge® to equip the plant with 10 UF lines as a pretreatment stage for RO.

As well as specifying top-quality UF technology, consulting expertise, and engineering services at the planning stage, the client also expressly requested an expanded package of services for this project. In response, inge® offered not only its high-performance ultrafiltration racks with their patented Multibore® membrane fibers, but also the central header pipes, valve units, local instrumentation and assembly of the UF lines. This full package bid proved to be enough to secure the contract.

Despite the fact that the quality of the feedwater turned out to be significantly lower than the figures stated in the tender, the UF system has been successfully supplying 135,000 cubic meters a day (35.7 MGD) of pre-filtered water to the RO stage ever since, helping to turn sea water into clean drinking water for the local population.
Putatan in the Philippines

Challenges of the Philippines' largest lake

The private water company Maynilad operates in the western part of the Manila metropolitan area in the Philippines, supplying drinking water to over nine million people. Maynilad runs a total of three water treatment plants, one of which – situated in the Putatan barangay in the city of Muntinlupa – uses inge® ultrafiltration technology.

The water is drawn from the Laguna Lake, which lies to the south-east of Manila and borders Muntinlupa. The lake water undergoes a rigorous filtration process before being used to supply 490,000 people with a total of 150 million liters of clean drinking water a day, 50 million liters (13 MGD) of which is filtered by inge® ultrafiltration technology.

Purifying the water poses some significant challenges, however. As well as seasonal variations in water quality, the lake becomes also soiled by industries that include a nearby slaughterhouse and extensive fish farming right next to where the water is extracted. Despite the often extremely poor quality of the lake water, the inge® ultrafiltration models have been running without a hitch for the past two years, delivering consistently clean water that meets the required quality standards.

But it wasn’t just the high yields and consistent quality of the purified water that prompted the operator to choose this system. Both the plant constructor and the end customer were reassured by inge®'s experience and expertise in treating surface water as well as by the flexible operation of its innovative T-Rack® 3.0 concept. They were also impressed by the comprehensive technical support inge® provided throughout the installation and commissioning stages. The whole package was rounded off with extensive training for treatment plant employees by the inge® team. This ultimately led to highly satisfied customers and an important reference project for the South East Asia region.

The follow-on project, which is due to be completed in 2018, is also based around inge® modules, providing yet another indication of how satisfied people are with this In-to-Out technology.
Jamnagar in India

inge® UF system for the biggest sea water desalination plant in the company's history

This mega project in the Indian city of Jamnagar was a genuine milestone in inge®’s corporate history. It involved the biggest sea water desalination plant that inge® had ever equipped with its membrane technology. Built by the contractor IDE Technologies, the plant supplies process water to one of the world's largest refinery complexes in Jamnagar, which is situated in the Indian state of Gujarat. inge® supplied the UF modules used as a pretreatment stage for reverse osmosis (RO) in the sea water desalination process.

Over 4,000 T-Rack® 3.0 modules went online in April 2017. Since then, they have been supplying 456 million liters (120 MGD) of pre-cleaned water a day to the RO units. The inge® UF pretreatment stage significantly improves the quality of the sea water that is treated using conventional pre-cleaning methods. The UF modules play a major role in protecting the highly sensitive reverse osmosis membranes.

inge® initially installed a pilot system on-site to prove that its modules could comfortably fulfill the customers demanding standards for the UF system. Even during the monsoon season, when the water was particularly challenging, the UF module still met the targets for process stability, filtrate quality and yield. What's more, the T-Rack® 3.0 concept satisfied all the customer's requirements regarding a compact and space-saving design. During the execution of the project, inge® provided top-notch technical support for the entire UF system in collaboration with the plant contractor.
Jazan in Saudi Arabia

inge® technology on the Red Sea

Another key project undertaken by inge® involved a plant in the port city of Jazan in the Kingdom of Saudi Arabia, situated on the coast of the Red Sea. The UF membrane experts were selected by the petroleum company Saudi Aramco to provide UF modules as a pretreatment stage for a sea water desalination plant. The inge® modules are designed to deliver 105,000 cubic meters of filtered water a day (27.8 MGD) to the reverse osmosis stage.

The end client, Saudi Aramco, insisted on a top-quality UF system and laid down a series of rigorous requirements for the technical equipment and documentation. All the suppliers involved in the project were subject to the most demanding standards. This policy included the UF lines, which had to comply with strict earthquake-resistant design specifications. The plant contractor was familiar with and enthusiastic about inge® products and technical support based on their experience with previous projects in Saudi Arabia. Together, the contractor and the inge® team managed to fulfill all the customer’s stipulations and win the contract.

A further sea water desalination plant has already been commissioned in Jazan. Once again, it will deploy inge® UF technology as a pretreatment stage for RO. The new plant will be used to convert sea water into drinking water for Jazan Economic City, a recently established city 60 kilometers north-east of Jazan. This planned city, which will eventually be home to 500,000 people, will be based around the manufacturing industry and the energy sector. The UF system will have an output of 168 MLD (44.4 MGD). The drinking water treatment plant is expected to be up and running by the end of 2018.
TUAS III – Singapore

Drinking water from the ocean for a country without a ready supply of fresh water

Another mega-project that offers a striking example of inge® technology in the Southeast Asia region is TUAS III in Singapore. The island city-state has no fresh water reserves of its own and is therefore entirely reliant on alternative sources of drinking water. As well as rainwater collection, these sources include cleaned and recycled water, imported water and seawater desalination.

This latter option already makes up one quarter of Singapore’s water supplies and is steadily gaining in importance. Since 2005, the country has had the technology in place to secure enough water for its more than 5.5 million citizens, and by 2060 it hopes to cover 30 percent of its water requirements with sea water desalination.

The new sea water desalination plant TUAS III is currently under construction and is scheduled to come online by the end of 2017. inge GmbH is supplying the UF system to pretreat 289,000 cubic meters a day (76.6 MGD) of pre-filtered water for the subsequent reverse osmosis stage.

This is the first sea water desalination plant in Singapore that will be run directly by the national water agency PUB. The end customer has therefore insisted on the highest standards of quality for all the system components. As well as supplying the UF technology, inge® also provides extensive technical support to ensure all the customer’s requirements are met.