



**SAFE DRINKING WATER
WITH ULTRAFILTRATION**

Case study

HYDRAcap[®]MAX 60 ultrafiltration membranes solve turbidity and bacteria removal issues at Senj, Croatia

The

PROBLEM

Modern Senj is a seaside tourist town with a population of just over 7,000. Senj Municipality used sand filters followed by post-chlorination to produce drinking water supply for many years. But they faced quality issues in the plant.

Filtered water bacteria and turbidity levels were high and the plant was unable to comply

to regulatory requirements. Chlorine dosing had to be increased to keep bacteria counts down, which increased formation of harmful disinfection by-products.

Raw water turbidity varied between 1 and 50 NTU. This caused additional operational issues with the sand filters, affecting filtrate quality.

Location	Senj, Croatia
Feed water source	River / lake / pond water
Application	Drinking water
Capacity	400 m ³ /h
Start-up date	September 2014



The

SOLUTION

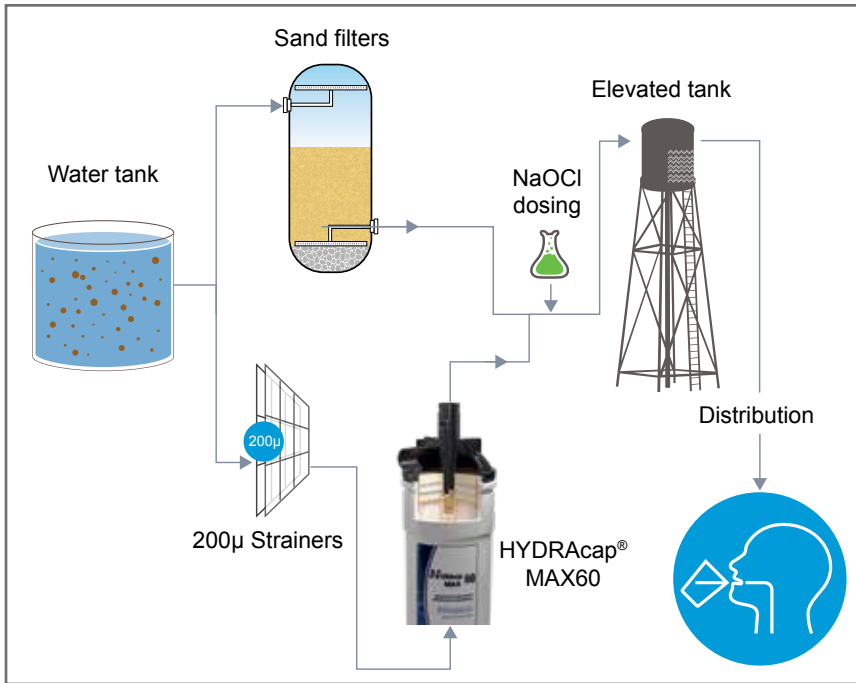
Hydranautics came with a solution to use their HYDRAcap®MAX 60 UF membranes. The UF system was installed parallel to the sand filters. See *System Description* table on the next page. As shown in the block diagram, filtrates from sand filters and UF membranes were blended. Chlorine was added to maintain a residual concentration.

HYDRAcap®MAX 60 UF membranes produced excellent filtrate quality, see *UF System Performance* table on the next page.

The system did not use backwash system, as normally used in UF systems. After filtration

cycle is completed, membranes are physically cleaned by air scouring for 1.5 minutes. They are then drained, refilled and returned to filtration mode. This process wastes only 2% water, compared to 10% wastage from membranes that use backwash.

Membranes are chemically cleaned once every day with 200 ppm sodium hypochlorite and 1200 ppm sodium hydroxide solution to remove organic and biological foulants; and once every day with 1470 ppm sulfuric acid solution to remove inorganic foulants.



System Description

Module Type	HYDRAcap®MAX 60
Flow path	Outside to inside
Membrane area	78 m ²
Membrane material	TIPS PVDF
Filtration flux	75 l/mh
Filtration time	20-40 minutes
Recovery	98%
UF Design	2 racks of 34 HYDRAcap®MAX 60 modules (68 in total)



UF System Performance

Parameter	HYDRAcap®MAX 60
Feed turbidity	1-50 NTU
Filtrate turbidity	< 0.1 NTU
Bacteria removal	> 5 log
Total suspended solids	< 2 mg/l (below detection limit)

The IMPACT

The HYDRAcap®MAX system completely removed bacteria and provided consistent filtrate quality, independent of feed water quality. HYDRAcap®MAX is an efficient, reliable way to meet bacteria removal requirements in drinking water applications.



About the author

JOHN BANHAM

John Banham is Senior Manager of Technology (EU) at Hydranautics – A Nitto Group Company. He is a Chemical Engineer with over 30 years experience in water and waste water treatment specialising in membranes used in many applications. Designed and operated systems to meet the most stringent standards for use in industrial and municipal sectors.

John is based in UK and worked with BP to develop new membranes in the field and applied Hydranautics UF membranes for the removal of pathogens in potable water applications throughout Europe. He continues to work with clients to find new ways of deploying membranes in water treatment processes.

For more information about Hydranautics case studies, contact us at hy-info@nitto.com or visit our website at membranes.com

About Hydranautics

Since our founding in 1963, Hydranautics has been committed to the highest standards of technology research, product excellence and customer fulfillment. Hydranautics entered the Reverse Osmosis (RO) water treatment field in 1970 and is one of the most respected and experienced firms in the membrane separations industry. We joined the Osaka, Japan based Nitto Denko corporation in 1987 which was founded in 1918 and now has 117 companies in more than 20 countries, with over 30,000 employees worldwide. Our alliance with this global film industry giant boosts Hydranautics to a superior level of technological sophistication, product performance and customer response.

We are not simply product manufacturers; we are your membrane technology partners. As leaders of high quality membrane solutions, we believe our obligations extend beyond manufacturing and selling our products. Our skilled staff of technicians, engineers and service professionals assist in designing, operating and maintaining a robust, reliable and efficient membrane system to meet your requirements and exceed your expectations. Our support is offered from early stage conceptual design and engineering to start-up and maintenance, no matter the location globally whether it is on land or off-shore.

