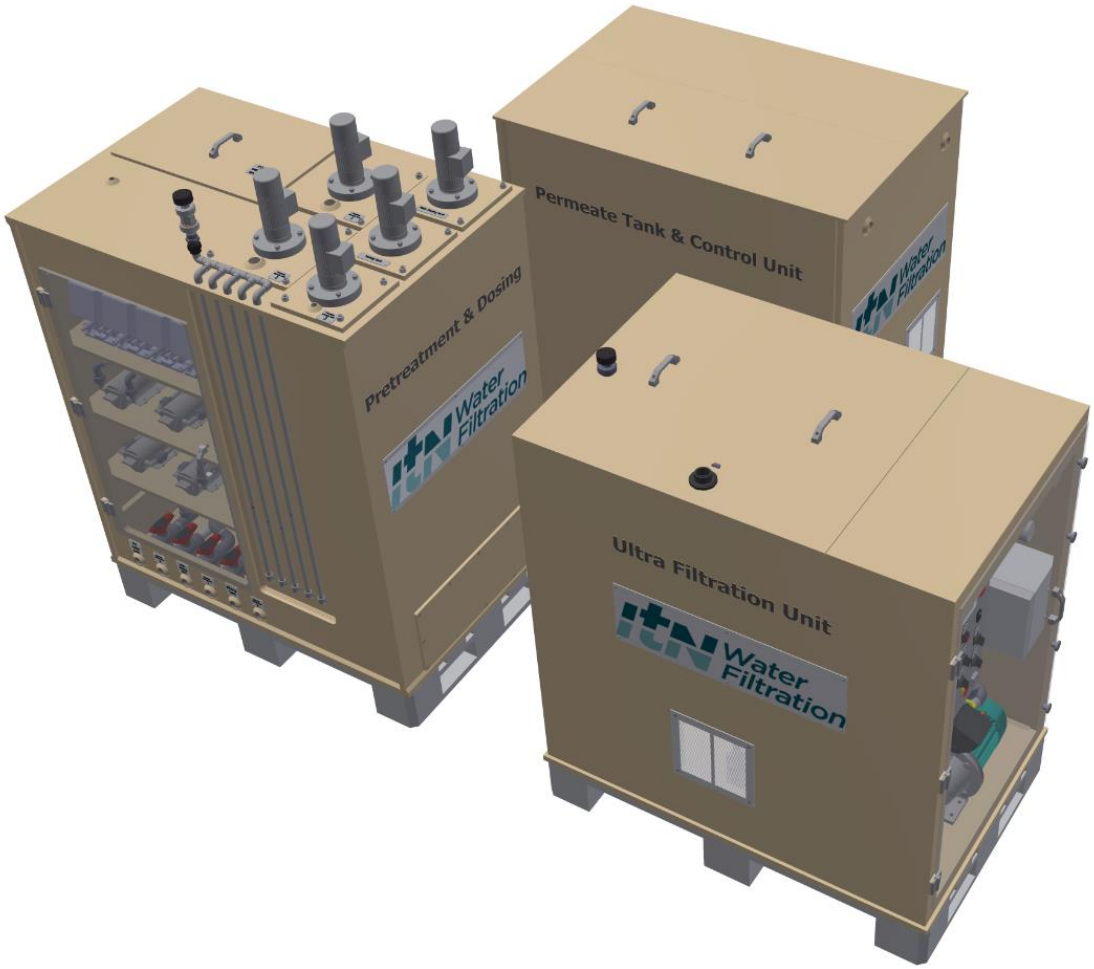


Cer@Senic, Arsenic Removal

Ceramic, Clean, Combined, Complete

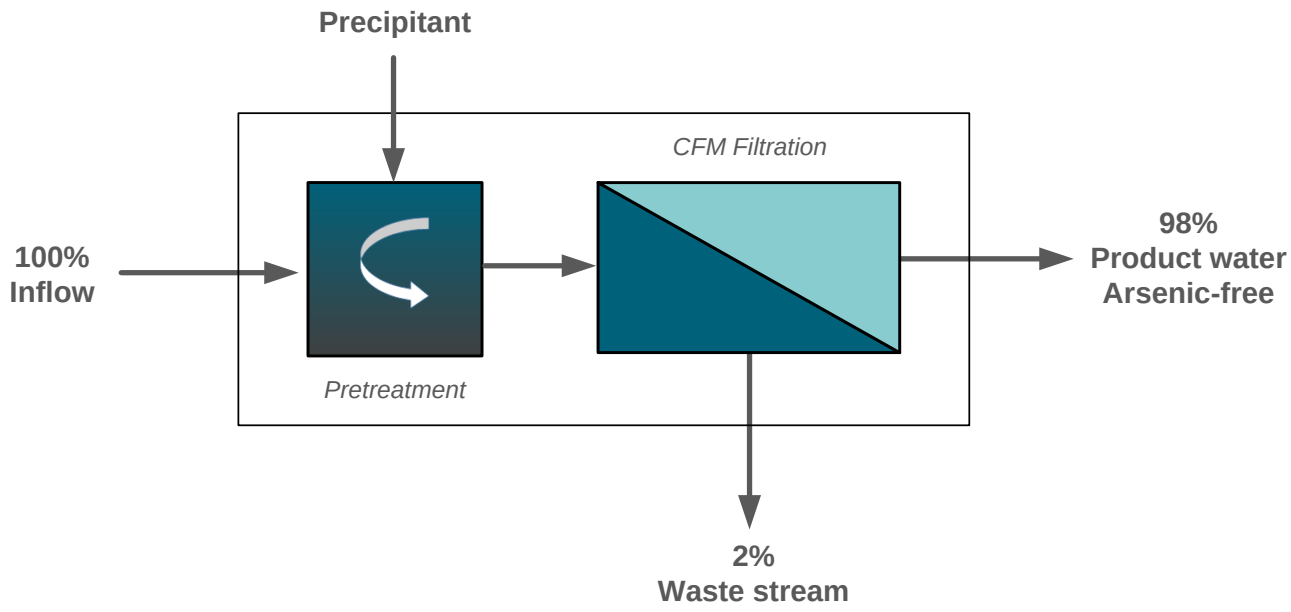
- **C**eramic flat membranes for extreme durability and high performance
- **C**lean drinking water fulfilling highest quality standards
- **C**ombined precipitation and filtration for maximum efficiency
- **C**omplete water treatment solution for small units and big scale plants

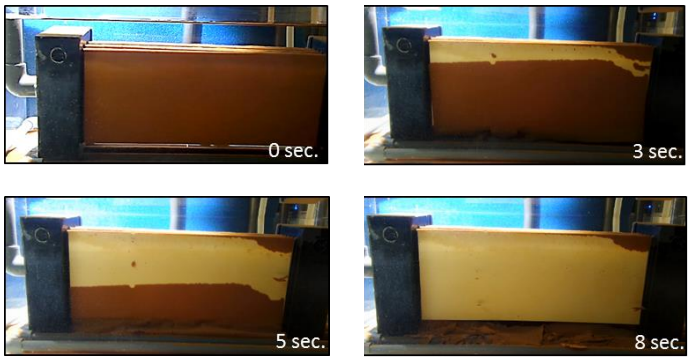
Our solution – Your benefit

The Cer@Senic Unit provides a complete solution for the supply of drinking water from small to medium communities, individual buildings and big scale water treatment plants.

The ultrafiltration technology in use is based on CFM Systems® (Ceramic Flat Membranes) by ItN Nanovation. CFM Systems® remove pollutants like particles and microorganisms and thus produce clear water free from biological and toxic hazards.

The Cer@Senic process combines precipitation with ceramic filtration. Pretreatment with the help of precipitant brings dissolved pollutants like arsenic into a particulate form. The formed suspended arsenate can be separated from the water by ultrafiltration with CFM Systems®.





During filtration a layer accumulates on the membrane surface. A simple periodic backwash with permeate suffices to remove the layer from the membrane and assures stable long term operation. The arsenate containing waste has neutral pH. This waste can be disposed of easily due to the insolubility in water.

Advantages of Cer@Senic compared to conventional processes

Precipitation or granular ferric filters	- 50% less chemical demand of precipitant and no extra coagulants - No need for regeneration or filter media change - Lower operational costs at higher life time - Lower waste stream - No accumulation of arsenic on filter media
Ion exchange	- No sensibility of system towards other ions, therefore no need for high cost pretreatment stages - Lower waste stream - No need for regeneration, therefore less chemical demand & less waste - Lower operational costs - No need to change the ion exchange medium - Higher life time
Reverse osmosis	- Less capital and operational costs - No need for high cost pretreatment stages - Much higher water recovery rate - No need for resalination of product water to make it drinkable

Cer@Senic – Quick facts

- **Fully automatic** arsenic removal process
- **Adjustable process** to water inlet flow and quality fluctuation
- **Up to 400 consumers** can be supplied per **small unit**
- **Up to 5000 consumers** can be supplied per (20 ft, 40 ft) **container**
- **More than 2 million consumers** can be supplied per **modular towers & racks**
- **No shortage** during daily consumption peaks
- **Crystal clear water** free from impurities
- **Safe drinking water** free from microorganisms and arsenic
- **Low maintenance** operation
- **Low energy** consumption

Technical data

Membrane pore size	200	nm
Standard transmembrane filtration pressure	0.1 – 0.5	bar
Maximum transmembrane filtration pressure	0.7	bar
Average backwash pressure	0.2 – 0.5	bar
Maximum backwash pressure	2.5	bar
Flux rate	300 – 400	L/m^2h
Arsenic removal rate (As conc. 50 – 500 ppb)	99 – 100	%
Recovery rate for drinking water	98	%
Energy demand	0.154	kWh/m^3
Chemical materials (big scale, price in Germany)	0.67	$cent/m^3$
Life time	More than 20 years	

Data depending on water composition and temperature

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