

Chemical-Free Water Treatment

(CHEMILES)

GROUNDWATER TREATMENT
FOR POTABLE WATER



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Chemical-Free Water Treatment (CHEMILES)

CHEMILES is a chemical-free groundwater treatment system for iron, manganese, ammoniacal nitrogen and arsenic removal; it is a cutting-edge solution for groundwater, with Nagaoka as LM's technology partner. CHEMILES has two options: stationary type and mobile type. The system is made to order; the treatment capacity ranges from 15m³/day~50,000m³/day.



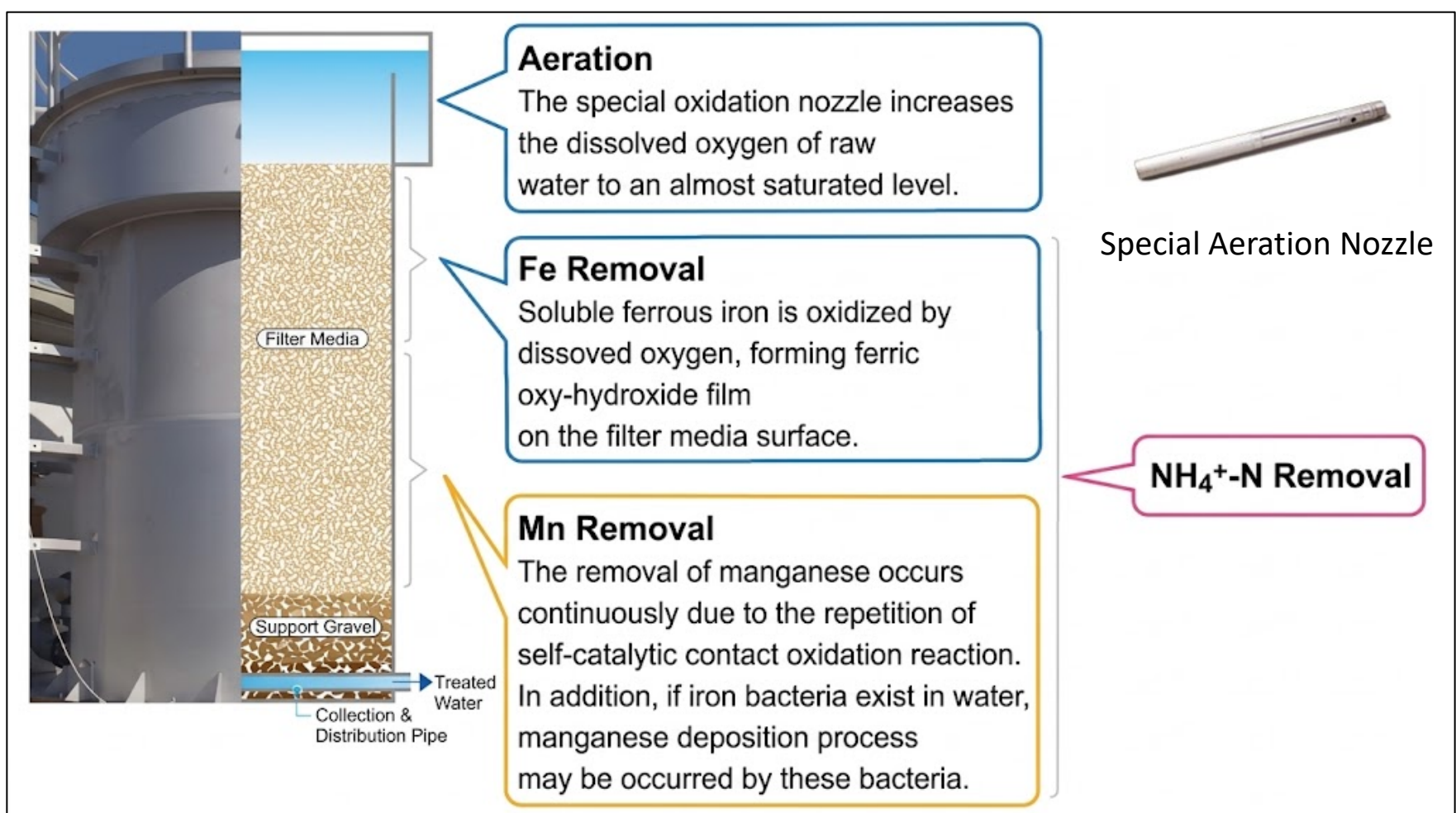
Stationary type



Mobile type

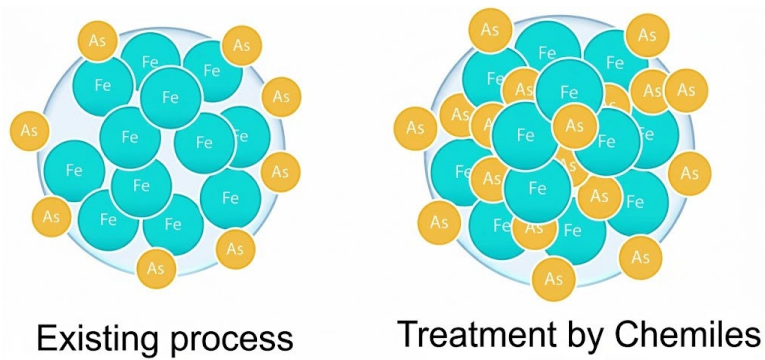
Treatment Principals

The system combines contact oxidation and biological treatment processes with a Special Aeration Nozzle to achieve efficient purification. It offers low operating costs, minimal maintenance requirements, and fully automated operation



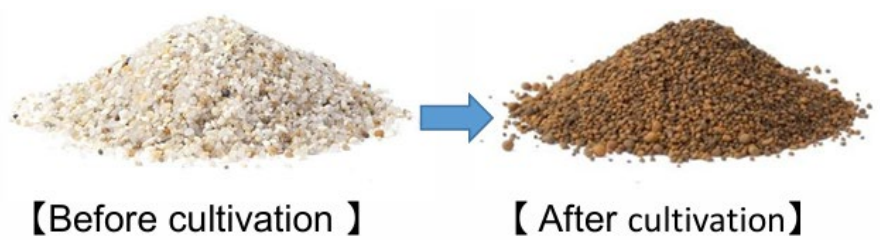
Arsenic Removal

CHEMILES can also remove arsenic without using chemicals. Arsenic in the groundwater is captured on the surface and inside iron oxyhydroxide crystals. This reaction is more efficient than existing coagulation/precipitation.



Cultivation Process

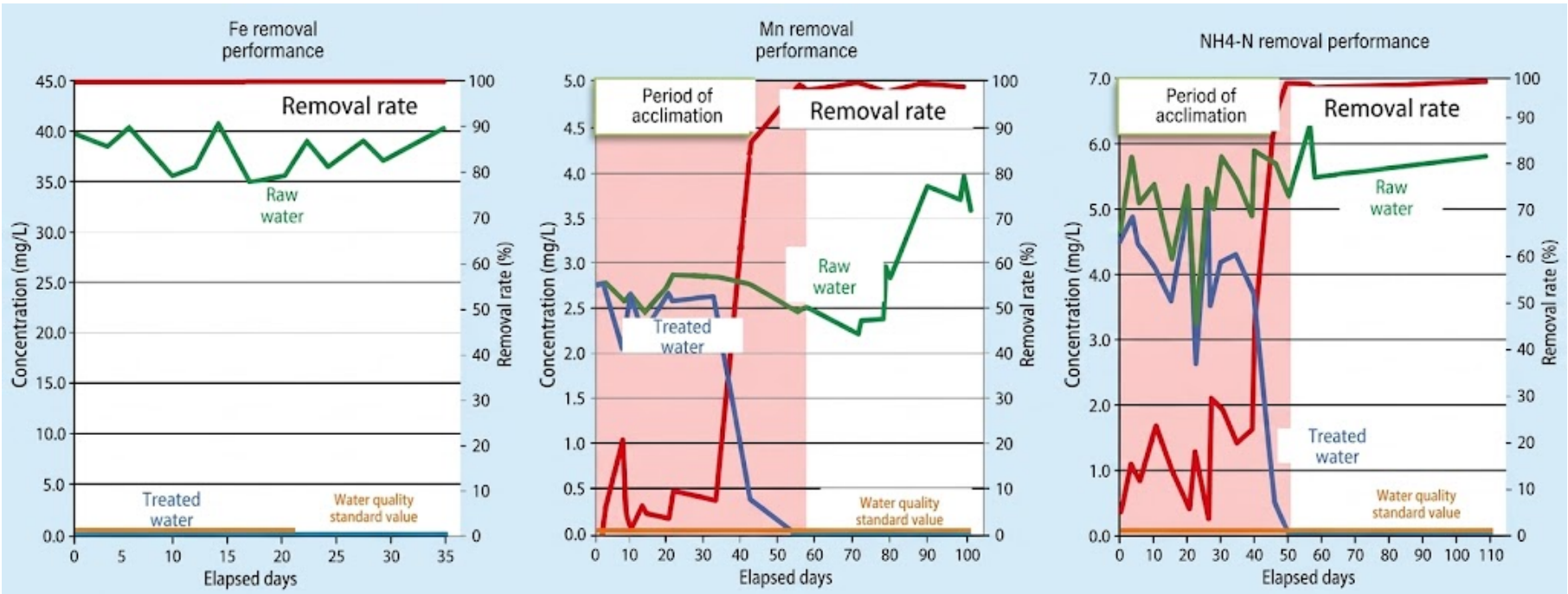
CHEMILES uses ordinary silica sand and does not use special sand like manganese Sand. After commissioning, Iron oxide film and manganese dioxide film are formed, and they remove iron and manganese, etc.



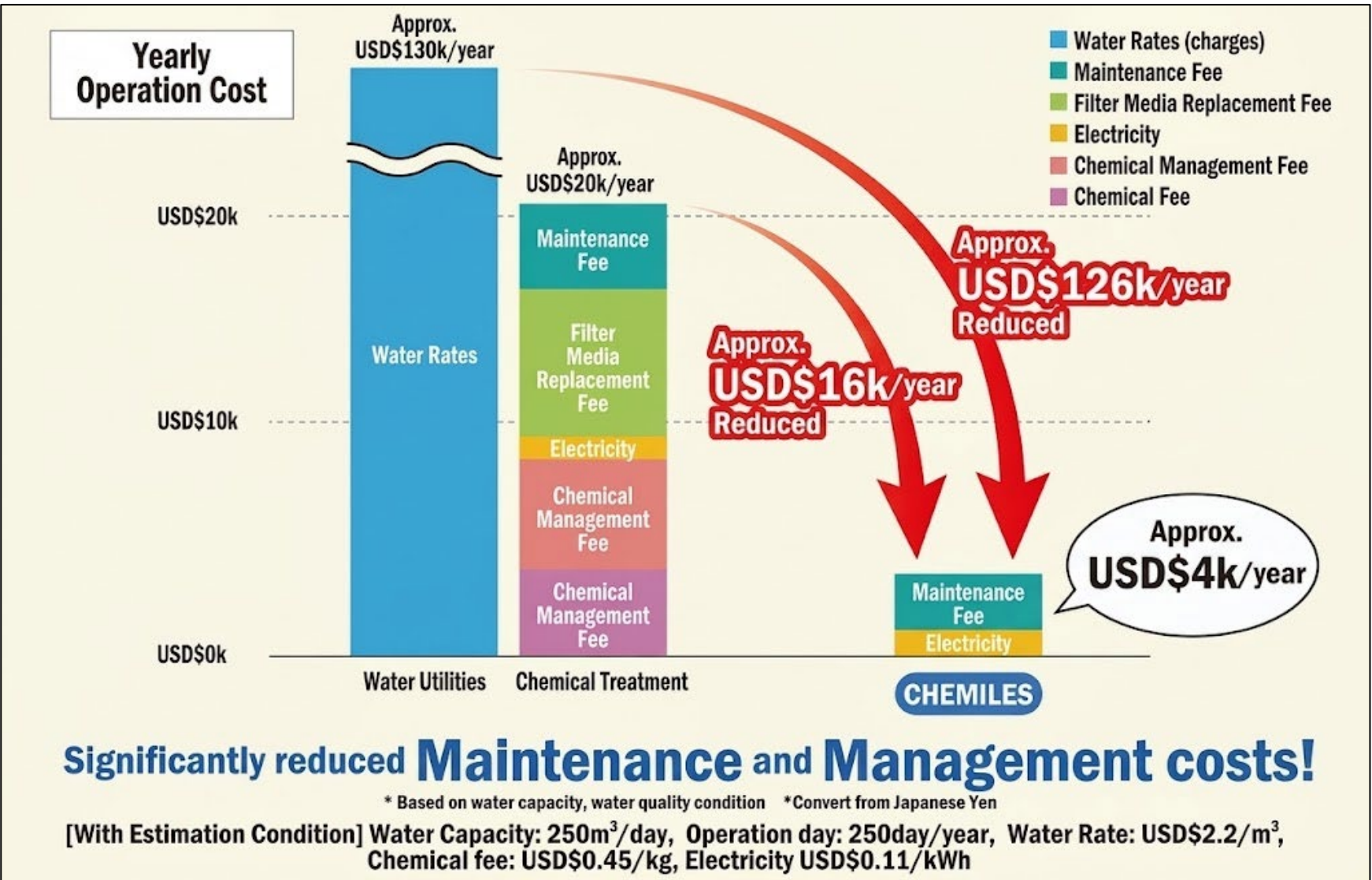
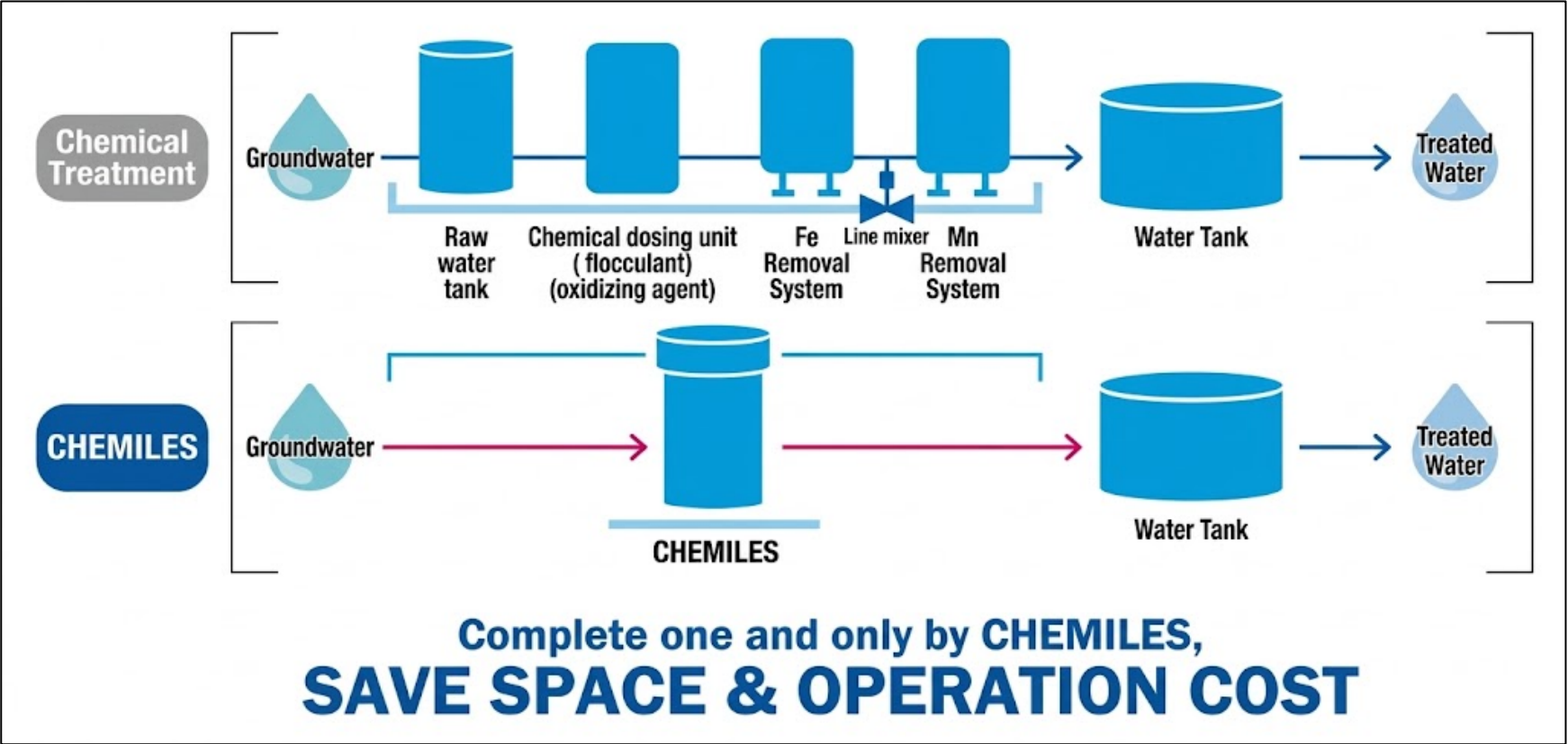
Treatment Performance

	Influent limit	Effluent target
Fe	40mg/L	0.3mg/L
Mn	5mg/L	0.05mg/L
NH ₄ -N	8mg/L	0.1mg/L
As	0.14mg/L	0.01mg/L
U	Depending on Fe condition	
Ra	Depending on Mn condition	

In addition to removing the substances listed in the table on the left, the system physically filters out substances covered by other general tap water standards, allowing almost all treatment to be completed with a single CHEMILES unit. Cultivation of manganese dioxide film and nitrification bacteria needs about two months.



Cost Merit of CHEMILES



Highlights of the Installation Record



Tunnel spring water
Arsenic removal system
Kagoshima Prefecture

Item	Specification/Condition
Numbers of CHEMILES	6 unites (1 unit for reserve)
Processing ability	9,600m ³ /day
Removal item	Raw water condition
Arsenic	0.14



Cailuo Water Treatment Plant
Shenyang, China
(Drinking Water)

Item	Specification/Condition
Number of CHEMILES	10 units
Processing ability	50,000m ³ /day
Removal item	Raw water condition
Fe	8.30
Mn	1.50
NH4-N	0.40

North of China, very cold area
The temperature drops to -30°C in winter

Target water quality

- $Fe \leq 0.3\text{mg/L}$
- $Mn \leq 0.05\text{mg/L}$
- $NH_4\text{-}N \leq 0.1\text{mg/L}$
- $As \leq 0.01\text{mg/L}$