Installation Example

2 examples out of approx. 100 installations

**DWTP in Shizuoka, Japan**
- Capacity: 10,000 m³/day (417 m³/h, 2.6 MGD)
- Raw water: Groundwater
- Operation Start: Year 2007

**Features of the Project**
- High Recovery Rate
  - Zero wastewater discharge to outside the plant

**DWTP in Kanagawa, Japan**
- Capacity: 171,070 m³/day (7,126 m³/h, 45.1 MGD)
- Raw water: Surface water
- Operation Start: Year 2014 (scheduled)

**Features of the Project**
- Natural Energy Utilization
  - (water level difference, Solar Panel)
- Privatization Project
  - (20-year operation and maintenance)

**DWTP**: Drinking Water Treatment Plant

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Ceramic Membrane Filtration System Promises Safe Water

The Ceramic Membrane Filtration System is a reliable technology to produce safe and secure water. METAWATER has one of the advanced systems in the world. With its unique characteristics, we can offer optimal water treatment solutions for increasing demands relevant to water all over the world.

Features of the Ceramic Membrane Filtration System
Solution for high quality and excellent water treatment

- **Safe and High Quality Water**: The 0.1\(\mu\)m pore size membrane removes most of impurities, organisms, and harmful bacteria.
- **Stable Operation**: The system can operate without shutdown even in a sudden turbidity increase in raw water.
- **High Water Recovery Rate**: More than 98\% of raw water is recovered as treated water because of dead-end filtration and low backwash frequency.
- **Easy Operation & Maintenance**: Mechanically and chemically strong ceramic membrane offers simple operation.
- **Low Operation Cost**: Higher energy efficiency and longer membrane life significantly reduce operating cost.
Schematic Flow

METAWATER provides the most suitable system for raw water quality fluctuation.

Pretreatment Process
- Microflocculating solids in raw water for membrane fouling reduction

Example of Additional Pretreatment

Manganese Removal System
- Accelerating iron and manganese oxidation by manganese catalyst
- No backwash required
- High linear velocity operation

Super Powdered Activated Carbon (SPAC) System
- Improving treatment using 3μm SPAC
- 60–80% volume of SPAC comparing to PAC and retention time reduction

Membrane Filtration Process
- Complete removal of bacteria and protozoa
- More than 98% of water recovery rate due to dead-end filtration and high backwash efficiency

Wastewater Treatment Process
- Easy solid-liquid separation only by gravity
- Clear supernatant and small amount of thickened sludge
- Small footprint

* Application Example: Surface water, Groundwater

* No feed pump is required when gravity filtration is possible.

* 99.8% recovery rate could be achieved by returning supernatant back to raw water tank.
**Filtration Mechanism**

- **Filtration Process**
  - Filtrate collection cell
  - It is contained inside the ceramic membrane element to collect filtrate.

- **Backwash Process**
  - Fouling matter separation
  - High-pressure backwash water detaches the fouling matter at 500kPa (5 bar, 72 psi)

- **Membrane filtration cell**

**Features of Ceramic Membrane Element**

- **High Mechanical Strength and Resistance to Chemicals**
  - The ceramic material is highly resistant to pressure, heat, and corrosion, resulting in no membrane breakage.

- **Long Operation Life**
  - The ceramic membrane element maintains its performance for a long time.

- **Low Environmental Impact**
  - Used membranes can be reused as raw ceramic material.

**Ceramic membrane element**

**Membrane Element Specifications**
- Type: Inner pressure monolithic
- Material: Ceramics
- Nominal pore size: 0.1 μm
- Outer diameter x Length: 0.0180mm x 1,500mmL
- Membrane cell inner diameter: approx. 2.5mm
- Membrane area: 25m²

**Newly developed water treatment system for small scale**

**Package Type Drinking Water Treatment Plant (DWTP)**

**Features of Package Type DWTP**
- Shortening Work Periods
- Space Saving
- Low Cost
- Unattended Operation

**System Specification**

<table>
<thead>
<tr>
<th>System Configuration</th>
<th>1 Element x 2 Modules</th>
<th>2 Elements x 2 Modules</th>
<th>3 Elements x 2 Modules</th>
<th>3 Elements x 3 Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Treatment Capacity (m³/d)</td>
<td>Ground water</td>
<td>100—200</td>
<td>200—400</td>
<td>300—600</td>
</tr>
<tr>
<td>Surface water</td>
<td>75—150</td>
<td>150—300</td>
<td>225—450</td>
<td>338—675</td>
</tr>
<tr>
<td>Size</td>
<td>2.1m³ x 5.2mL (3)</td>
<td>2.1m³ x 6.4mL (2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>