



## Advanced Treatment of Hospital Wastewater

In 2004, Mitsubishi Rayon was awarded "The Nikkan Kogyo Shimbun Prize".

### • Name of System

Kinki University Nara Hospital

### • Start of Operation

October 1999

### • Outline of System

An advanced treatment system which uses coagulants and membrane bioreactors in an intermittent aeration tank system removes components such as nitrogen and phosphorus from routine wastewater discharged by the hospital.

### • Throughput

750 m<sup>3</sup>/day

### • Influent BOD

200 mg/L

### • Membrane Modules

192 pieces of "UMF834LF" element (1,536m<sup>2</sup>)  
900 pieces of "SUR234" element (1,350m<sup>2</sup>)

### • Membrane Cutoff

0.4 μm

### System Features

Hospital wastewater may be broadly divided into two types: ordinary wastewater, which is very similar to non-industrial municipal wastewater, and special wastewater arising from functions specifically associated with medical facilities. Ordinary wastewater, which represents as much as 80% of the total wastewater flow, may usually be directly discharged into a public system. In some cases, however, kitchen wastewater must be pretreated before being combined with other ordinary wastewater. Special wastewater arising from various hospital specific sources such as surgery, autopsy, laboratory, RI test, and infectious disease areas normally require the construction of wastewater treatment systems where the two types of hospital wastewater can be effectively treated to eliminate the risk of infection from pathogens.



Kinki University Nara Hospital



Water treatment facility

### Remarks

The use of membrane bioreactors within the hospital's wastewater treatment system continuously stabilizes the quality of the treated water, ensuring that safe water unaffected by pathogens can be released to public sewage.

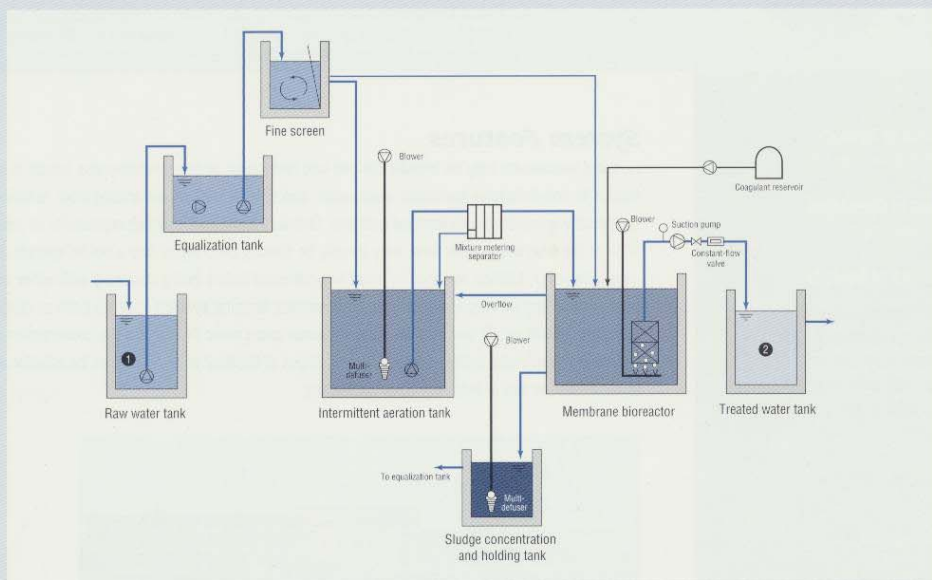
### ● Advantages of Membrane Use

- Assures safe water

Effluent release standards for conventional purification tanks are 3,000 *E. coli* colony-forming units (CFU) per liter. By contrast, use of a membrane bioreactor enables a pathogen removal ratio of 7 log (99.99999% removal), to a pathogen level of essentially zero.

- Greatly lowers installation costs and space requirements.
- Prevents excessive sludge generation
- Safe to operate and maintain

• **Flow Sheet**



• **Water Quality Analysis**

Test	Raw water ①	Effluent regulation	Membrane-treated water ②
pH	(-)	5.8-8.6	7.4
BOD	(mg/L)	200	≤10
COD	(mg/L)	150	≤10
SS	(mg/L)	250	≤10
T-N	(mg/L)	50	≤10
T-P	(mg/L)	5	≤3
n-Hex	(mg/L)	30	≤20
<i>E. coli</i>	(CFU/mL)	10 <sup>6</sup> -10 <sup>8</sup>	<3×10 <sup>5</sup>

• **Operating Conditions**

MLSS: 8,000-10,000 mg/L

Suction Pump Operation:

13 minutes on (operating)

2 minutes off (at rest)



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This sheet presents one example of a membrane bioreactor/purification system that has been evaluated and approved by the Building Center of Japan, and the Japanese Minister of Construction. Each system must be individually designed for the water quality of the influent and the target wastewater standards.



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