

# Application of membrane utilization technology to sewage systems

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## 1. Introduction

Since the development of reverse osmosis membranes in the United States in the early 1960s, research has been conducted to develop a variety of kinds of membranes and to apply separation technologies using membranes, and at this time, they are used in a wide range of fields including manufacturing industries, medical treatment, water treatment and so on. In the sewage and wastewater treatment fields in Japan, the first treatment system using membranes was introduced in 1988 at a night soil treatment plant in Gojome Town in Akita Prefecture. Its application in sewage systems was a little delayed until, in 2005, the public sewage final treatment plant in Fukusaki Town in Hyogo Prefecture was constructed applying a Membrane Bioreactor<sup>\*1</sup> (below called, “MBR”). Since then, the number of MBR constructed has increased, with a total of 17 plants (including one provisional facility and one verification trial plant) in operation as of January 2012, and the increase in the use of the method will speed up in the future.

## 2. Intention to apply the technology to sewage systems

MBR, which has become the international standard method of applying membrane utilization technology to sewage systems, is counted on to play the new role of creating water reuse/use networks intended to establish sound water cycles, and to add this role to the original roles of sewage systems, which are ensuring public hygiene and preserving public use water areas. This is a result of the fact that in addition to the ability of MBR to almost completely remove suspended solids and bacteria etc. from sewage, it removes viruses far more effectively than conventional treatment methods, and that it makes it easy to transform an existing facility into an advanced treatment facility.

## 3. Initiatives taken as part of this research

The NILIM has taken action to expand its use by

providing technical support by, for example, making a general evaluation of MBR<sup>\*1</sup> and by enacting the Guideline to Introduction of Membrane Treatment Technology to Sewage Systems (First Edition, Second Edition). At the present time, in order to prepare a draft MBR maintenance standard, it is collecting general data concerning facility operation and performing field surveys and interviews, to clarify the challenges to maintenance and to study countermeasures. Among these, it is performing a priority survey of chemical cleaning of membranes, which is the key to clarifying whether or not MBR operation should be introduced, because performing this more efficiently while consuming less power is vital. The results of a past survey<sup>\*2</sup>, have confirmed that differences between types of membrane and cleaning method etc. have impacts such as temporarily lowering biological treatment functions. On the other hand, it suggests that it is possible to reduce this impact by improving the cleaning method, so in the future, specific improvement measures will be studied.

## 4. International standardization trends

Seven years have passed since the start of activity to promote international standardization of MBR technology by the EU, but at this time, there is no surface movement to realize this. MBR has been introduced not only into industrialized countries, but into many other countries, and ISO standardization is now considered to be important. Japan intends watch trends in Europe while it promotes standardization in cooperation with China and Korea, where the MBR introduction environment is similar to Japan's, and the NILIM will, in order to participate in this, join a committee formed by NEDO (New Energy and Industrial Technology Development Organization).

[Reference]

\*1. NILIM web site, “Completion of the General Evaluation of MBR –Evaluation as a Method of Sewage Treatment which can be Applied Nationwide—  
[http://www.mlit.go.jp/report/press/city13\\_hh\\_000100.html](http://www.mlit.go.jp/report/press/city13_hh_000100.html)

\*2. Technical Note of the National Institute for Land and Infrastructure Management, No. 654, pp. 71-76.