

Operation and Maintenance of RO Desalination Plants

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Overview of RO desalination process and representative performance of RO membrane elements

Configuration and major components of the RO desalination plants

- Brackish water plants
- Wastewater reclamation plants
- Seawater desalination plants

Representative performance targets of RO desalination projects

Recommended procedures for plant commissioning, acceptance test and operation

Labour and consumables requirements of RO desalination process

Maintenance of desalination plants

- Major process equipment
 - o Monitoring of equipment operation and scheduled maintenance
- RO membrane elements
 - o Monitoring performance of membrane elements
 - o Preventive maintenance and cost-effective approach to restoration of desalination plant performance

Troubleshooting of RO plants performance deterioration

- Common causes of membrane performance deterioration and major equipment failure (brackish, wastewater reclamation, seawater RO)
- Determination of causes of membrane fouling processes
- Application of preventive measures

Components of the RO plants operating cost

Optimization of operating procedure of RO plant for reduction of water cost and improvement of equipment durability

- Approach to reduction of usage of pretreatment chemicals
- Approach to reduction of process energy usage
- Approach to reduction of membrane cleaning frequency
- Approach to reduction of membrane replacement rate
- Approach to reduction of cost of disposal of process residuals
- Approach to maintaining designed plant load factor

Selection and qualification of equipment and membrane types for reliable plant performance

Case studies

- Description of operational problems

- Development of solutions
 - o Brackish water desalination plant – membrane scaling
 - o Brackish water desalination plant – biofouling
 - o Brackish water plant – organic adsorption
 - o Wastewater reclamation plant – mixed colloids fouling
 - o Seawater desalination plant – biofouling
 - o Seawater desalination plant - colloidal fouling
 - o Seawater desalination plant – corrosion equipment failure

- Lessons learned

Summary and discussion of good engineering practice in plant design, commissioning, operation and maintenance of RO desalination plants