



# GUIDEBOOK MEMBRANE DESALINATION TECHNOLOGY

## Reverse Osmosis, Nanofiltration and Hybrid Systems Process, Design, Applications and Economics

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This is a process and application guidebook that encompasses the latest state of the art of commercial membrane desalination technology. This unique book provides a thorough overview and understanding of the RO, NF, and hybrid system, all with a detailed discussion on how to apply, design and operate potable systems and how to evaluate project economics using innovative membrane technologies. A must-read for all project engineers, plant designers, planners, utility directors, and operation managers, involved in municipal and industrial membrane projects. Also scientists and academics interested in membrane desalination will find in this guidebook an insight into latest trends in commercial membrane desalination technologies for potable water applications. A step by step approach to design, operates and cost evaluation of membrane systems is explained in simple practical terms, all backed up by sample process calculations and case studies.

The contents of the book provides information, education and real life examples of the following major subjects:

**Principles of membrane separation** – provides explanation of membrane technology and factors that affect membrane element performance in field operation.

**RO/NF system configurations and system design parameters** – provides information on major components, process steps and configuration of desalination plants and modern approach to membrane plant design process including optimization of power consumption.

**Application of RO and nanofiltration technology in wastewater reclamation plants** – provides an overview of suitable membrane technology for wastewater processing, a practical range of design parameters and experience based performance expectation.

**Cost estimation and planning process of membrane desalination projects** – provides detailed information on cost factors to be considered in preparation of a desalination project budget. It also includes detailed discussion on their relative importance in different types of desalination project alternatives such as turn-key, DBB, DBO and BOOT.

**Concentrate disposal** – described in terms of concentrate disposal constraints and engineering solutions presently available. A detailed evaluation of economics of various concentrate disposal alternatives is included.

**Hybrid systems** – provides information on this new emerging technology and system configurations. It describes various alternatives of hybrid process configurations, potential economic benefits and provides a range of operating parameters.

**Appendixes** – includes examples of process configurations, budgeting of RO seawater systems and detailed evaluation of a specific case of concentrate disposal.

The contributors to the book are well known professionals in the desalination field with extensive involvement in research and development of membrane products and desalination processes. The book contents reflect their R&D work and experience in design, procurement and operation of numerous membrane systems. The information included in this guidebook represents the current state of the art of commercial membrane desalination technology.

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(by Nikolay Voutchkov)

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RO concentrate management (by Mike Mickley)

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## References

### Appendixes

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- Example of feasibility evaluation of RO concentrate disposal alternatives (Mike Mickley)
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