



UF/MF Membrane Water Treatment

Principles and Design

Graeme Pearce



Water Treatment Academy
(TechnoBiz Communications Co., Ltd.)

UF/MF Membrane Water Treatment: Principles and Design **Dr Graeme K Pearce, Membrane Consultancy Associates**

387 pages, hard cover, published 10th September, 2011 (ISBN number 978-616-90836-3-4)

Membranes have been used in water treatment applications for nearly 50 years. However, it took the emergence of drivers for quality improvement and resource development in the 1990s to give rise to the last decade of explosive growth and falling prices. Membranes now compete with conventional technology in many areas, and will play a critical enabling role in meeting the challenges of water supply and wastewater treatment in the 21st century.

This book provides a comprehensive description of the state of the art of ultrafiltration (UF) and microfiltration (MF) membrane technology in water and wastewater applications. The book will give practitioners a comprehensive understanding of all key facets of membranes and their application. The objective of the book is to provide a description and explanation of membrane technology in the water industry, and to improve the experience of trying to implement a scheme. The book will be essential reading for all project and process engineers, plant designers, planners, and operational personnel involved in municipal and industrial membrane projects. Also scientists and academics interested in the application of membranes in the water field will gain insight into latest trends in commercial membrane technologies.

Note on the Author

Dr Pearce has 30 years of experience in the Membrane Industry, and holds a Chemistry degree and Chemical Engineering doctorate from Oxford University. He has worked in membrane research at BP, for a membrane system company at Kalsep, and a membrane manufacturing company at Hydranautics. Currently Dr Pearce is an independent consultant, forming Membrane Consultancy Associates (MCA) in 2005 to specialize in UF/MF technology. MCA helps companies with market analysis, business strategy, technology selection, and problem solving.

Table of Contents (Abbreviated)

Chapter 1: Introduction

- 1.1 Background
- 1.2 Membrane Markets
- 1.3 Membrane Technology for the Water Industry
- 1.4 Drivers
- 1.5 Segmentation of the Water and Wastewater Market
- 1.6 Regulatory Standards
- 1.7 Approvals

Chapter 2: Membrane Filtration Fundamentals

- 2.1 Basics
- 2.2 Polymeric Membrane Characteristics
- 2.3 Ceramic Membrane Characteristics
- 2.4 Transport Phenomena
- 2.5 Fouling Phenomena
- 2.6 Fouling Control Procedures
- 2.7 Dosing Chemicals
- 2.8 Foulant Removal
- 2.9 Flux & Permeability
- 2.10 Effect of Temperature
- 2.11 Filtrate Quality

Chapter 3: Commercial Membranes & Modules

- 3.1 History of UF/MF Membrane Development
- 3.2 Overview of UF/MF Products
- 3.3 Manufacture of UF/MF Products
- 3.4 Module Format and System Configuration

Chapter 4: System Design

- 4.1 Background
- 4.2 Flux Guidelines
- 4.3 Selecting Design Flux from Pilot Data
- 4.4 System Configuration
- 4.5 Membrane Filtration System Process Flow
- 4.6 Building Blocks for Membrane Filtration Equipment
- 4.7 Selection and Sizing of System Components
- 4.8 Process Control Philosophy (PCP)
- 4.9 Package System Design

Chapter 5: Drinking Water Treatment

- 5.1 Background
- 5.2 Dissolved Organic Carbon (DOC)
- 5.3 Disinfection
- 5.4 Iron and Manganese
- 5.5 Micro-biological Contaminants
- 5.6 Algae
- 5.7 Silica
- 5.8 Membrane Integrity
- 5.9 Pressure Decay Test (PDT)
- 5.10 Indicative Capital and Operating Costs

Chapter 6: Wastewater Reuse

- 6.1 Background
- 6.2 Conventional Activated Sludge (CAS) with Membrane Filtration
- 6.3 Membrane Bioreactor
- 6.4 Energy Use
- 6.5 Plant Cost Survey
- 6.6 Operating Plant Experience

Chapter 7: Desalination Pre-treatment

- 7.1 Background
- 7.2 Treatment Processes
- 7.3 Treated Water Quality
- 7.4 Indicative Capital and Operating Costs
- 7.5 Operating Plant Experience
- 7.6 Environmental Footprint

Chapter 8: Implementation and Operation

- 8.1 Background
- 8.2 Project Specification and Invitation to Tender
- 8.3 Piloting
- 8.4 Acceptance Testing
- 8.5 Performance Analysis
- 8.6 Common Problems and Remedies
- 8.7 Troubleshooting
- 8.8 Warranty

Chapter 9: Case Studies

- 9.1 Introduction
- 9.2 Drinking Water: Twin Oaks, California, USA
- 9.3 Drinking Water: Oregon State Parks, USA
- 9.4 Wastewater Reuse: Orange County, California, USA
- 9.5 Wastewater Reuse: Western Corridor, Queensland, Australia, Case Study
- 9.6 Seawater RO Pre-treatment: Beckton, London, UK

Appendix A: Review of Membrane Filtration Manufacturers' Technology

Appendix B: System Design

Book Order From

Pricing

	Option 1	Option 2	Option 3	Option 4
Currency	Cash*	Payment by Paypal add 6%	Post & Packing (P&P) add 12%	Paypal plus P&P add 18%
US\$	169	179	189	199
€	124	131	139	146
£	107	113	120	126

Notes:

Option 1 includes cash, personal cheque in US\$ from a US bank, or £ sterling from a UK bank, and hand delivery

Option 2 includes payment to the author's paypal account in one of the currencies above through a paypal account, or by credit/debit card, or by bank transfer, with hand delivery

Option 3 includes cash or cheque payment and postal delivery

Option 4 includes payment through paypal and postal delivery

Indicate transaction currency: _____

Indicate payment option from table: _____

Indicate *Amount for Payment* from table: _____

Paypal Account Details

If you opt to make your payment by paypal, you will receive an e-mail request with payment instructions to the e-mail address you enter in the section below. The e-mail will request the *Amount for Payment* entered in the previous section. The author's registered e-mail for the receiving paypal account is graemekpearce@btinternet.com

Your Details

Name: _____

Company: _____

Tel: _____

Fax: _____

e-mail: _____

Delivery Address:

Membrane Consultancy Contact Details

Dr Graeme K Pearce
Little Eastfield, Eastfield Lane, Whitchurch, Reading, RG8 7EJ, UK