

**Overview of membrane processes and applications**

Membrane process	Feedwater characterisation	Minimum pre-treatment requirement	Pore size or Performance parameter	Operating pressure bar	System performance benchmarks	Common applications
Micro-filtration (MF)	Turbidity Iron BOD Suspended solids	200 – 500 µm pre-filtration	0.1 – 1 µm	0.05 – 1.5	Integrity testing Trans-membrane pressure (TMP) Flux	Cryptosporidium barrier Improvement of bacteriological quality RO pre-treatment Membrane bioreactor (MBR)
Ultra-filtration (UF)	Turbidity Iron BOD Suspended solids	50-150 µm pre-filtration	0.01 – 0.05 µm MWCO 5000-100,000	0.5 – 5	Integrity testing Trans-membrane pressure (TMP) Flux	Cryptosporidium barrier Improvement of bacteriological quality RO pre-treatment Colour removal
Nano-filtration (NF)	Turbidity Silt density index (SDI) Langelier saturation index (LSI)	Acid and/or antiscalant injection for scale control 5 µm prefiltration	MWCO <sup>1</sup> 200-500 Ca <sup>2+</sup> rejection 50-80% Cl <sup>-</sup> rejection: 10-30%	3.5 - 16	Salt rejection <sup>2</sup> Flux <sup>2</sup> Delta P	Surface water treatment: <ul style="list-style-type: none"> <li>• Colour removal</li> <li>• Softening</li> <li>• THM precursor removal</li> <li>• Pesticide removal</li> <li>• Selective sulphate removal</li> </ul>
Reverse Osmosis (RO)	Turbidity Silt density index (SDI) Langelier saturation index (LSI)	Acid and/or antiscalant injection for scale control 5 µm prefiltration	MWCO <sup>1</sup> 100 Ca <sup>2+</sup> rejection >99% Cl <sup>-</sup> rejection: >95%	5 - 65	Salt rejection <sup>2</sup> Flux <sup>2</sup> Delta P	Industrial pure water: <ul style="list-style-type: none"> <li>• Feed for further demineralisation</li> <li>• Boiler feed</li> </ul> Water supply <ul style="list-style-type: none"> <li>• Sea water desalination</li> <li>• Brackish well water desalination</li> <li>• Nitrate removal</li> </ul> Waste water treatment and re-use

1: molecular weight cut-off, is term used to describe the membrane separation limit of uncharged organic molecules, often referred to as Dalton units

2: parameters require normalisation

- [MicroCell dosing device](#)
- [Membrane cleaning and regeneration](#)
- [System and pre-treatment design](#)
- [Process commissioning and troubleshooting](#)