Nano-Filtration Plant

Selective membrane plants for hardness, colour and organics

Overview

Nano-filtration (NF) membranes sit between UF and RO. They hold back most hardness (calcium and magnesium), sulphate, colour and organics, but let a good part of the monovalent salts such as sodium chloride pass. This makes NF a softening and polishing step that needs less pressure and energy than RO.

Arukal supplies NF plants with membranes, pressure vessels, high-pressure pumps, instruments, cleaning system and controls. NF is used for softening without salt, colour removal, partial desalination and as a pre-treatment.

80 – 98 %	5 – 15 bar	70 – 85 %	1 – 100 m³/h
Hardness rejection	Operating pressure	Recovery	Capacity

Key features

Softening without salt Removes hardness with no regenerant chemicals.	**Partial desalination** Keeps some minerals, which suits some drinking water uses.
Colour and organics Reduces colour, TOC and many organics.	**Complete skid** Pump, vessels, instruments and cleaning system.
Lower energy than RO Operates at lower pressure, so pumping cost is lower.	**Selection support** We choose the element from your analysis.

Applications

Salt-free softening • Colour removal from groundwater • Dairy and food processing • Textile and dye effluent reuse • Sulphate reduction • Partial desalination

How it works

1. Pre-treatment	2. Pressurise	3. Selective separation	4. Permeate and concentrate
Filters, cartridge filtration and antiscalant protect the membrane.	A pump feeds water at 5 to 15 bar to the NF elements.	Water and most single-charged salts pass; hardness, sulphate and organics are held back.	Softened permeate is collected; the concentrate carries the rejected salts to drain or reuse.

Care and handling

Pre-treat. Keep SDI low with filtration and dose antiscalant as designed.
Monitor. Record flow, pressure and conductivity to see fouling early.
Clean. Clean when flow falls or pressure drop rises by 10 – 15 %.

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Technical specifications

Typical values. Values are typical for the product family and given for guidance. Exact figures depend on the make and model supplied; ask us for the data sheet of the specific model.

Plant (typical)

Membrane type	Spiral-wound polyamide thin-film composite NF element
Hardness rejection	80 – 98 %
Sodium chloride rejection	20 – 70 % (element dependent)
Operating pressure	5 – 15 bar
Recovery	70 – 85 %
Feed SDI	< 5

Construction

Elements	4040 and 8040 NF elements
Vessels	FRP or SS pressure vessels
Pump	Multistage centrifugal, SS 304 / 316
Skid	MS powder-coated or SS frame with panel and instruments

Typical plant sizes

Model	Capacity	Elements	Typical use
NF 1	1 m³/h	2 × 4040	Small site, lab
NF 5	5 m³/h	3 – 4 × 8040	Colour or hardness removal
NF 10	10 m³/h	6 – 8 × 8040	Industrial softening
NF 25	25 m³/h	16 – 20 × 8040	Large plants

Capacity depends on feed water, temperature and recovery. Ask us for a design.

To receive a recommendation, send us:

- Feed water analysis (TDS, hardness, sulphate, colour, TOC, iron, SDI)
- Required permeate flow (m³/h) and hours of operation
- What you need removed (hardness, colour, sulphate, organics)
- Power and space available