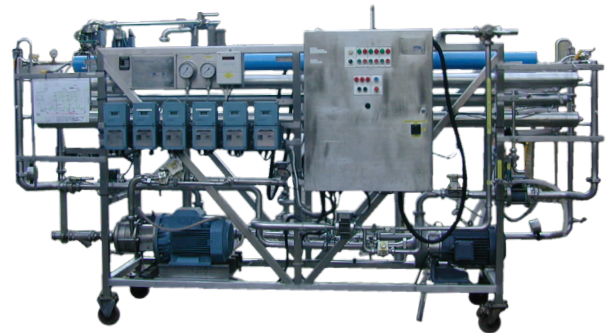


## UF15

A pilot plant designed for process development, membranes scale up testing, quality assurance and small-scale/production range within microfiltration or ultrafiltration phase.

The UF15 unit consists of two stages with each stage fitted with 3 modules and a heat exchanger. Also equipped with an Alfa Laval feed pump, Anema centrifugal recirculation pumps for each stage, pressure & temperature sensors, flowmeters and a control panel and a hold-up volume (circa 320 Liters). All mounted on a welded 304 stainless-steel framework.



### Application Range

Microfiltration (MF)	Ultrafiltration (UF)
up to 30 L/min	up to 30 L/min

Electrical Power Supply	Connections
380 or 415 Volts	Inlet to feed pump: 2" OD hose
3-phase (5 pins)	HE in/out cooling water: 3/4" OD hose connector
50 Hz. 100 Amp	Permeate outlet: 1 1/2" OD hose tail
Motor rating: 37 KW	Shroud outlet: 3/4" spigots and drained via a 1 1/2" manifold
	Concentrate outlet UF: 1 1/2" OD hose tail
	Pump seal flush water: 1/2" BSP female connector

### Size & Weight

Dimension			Unit & Package	Unit Only
Length	Height	Width		
3.9 m	2.4 m	1.2 m	1650 kg	1500 kg

### Framework

Welded stainless-steel frame fabricated from a high-grade 304 SS for corrosion resistance, high rigidity and temperature resistance.

### Module

#### 6 x 12 ft (3.6 m)

#### B1 Module (3 modules per stage)

Each Module has the following major components: A "Shroud", a "Tube-Nest", which is made up of 18 perforated stainless-steel tubes and "End Caps". Each of the 18 tubes are fitted with membranes. The modules on the UF15 plant are designed with a twin entry end caps; providing 2 parallel channels, each of 9 tubes in series. The modules are fed in parallel. There are 2 stages of 3 modules fed in parallel.

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### Specification per module

- Membrane area: 2.6 m<sup>2</sup>
- Module weight: 33.7 kg
- Hold-up volume: Tube-side 8.4 L, Shroud-side 20 L
- Membrane tube ID: 12.7 mm
- Total membrane area for all modules: 15.6 m<sup>2</sup>

### Heat Exchanger (HE) 2 X 12 Ft (3.6m) Shell & Tube Type Heat Exchanger

Process fluid is piped from the outlet of the pump and passes through the module in 2 pathways within the heat exchanger while cooling water passes at low pressure (1-3 bar) through the shroud (shell) side. Cooling media flow could be up to 25 L/min/stage.

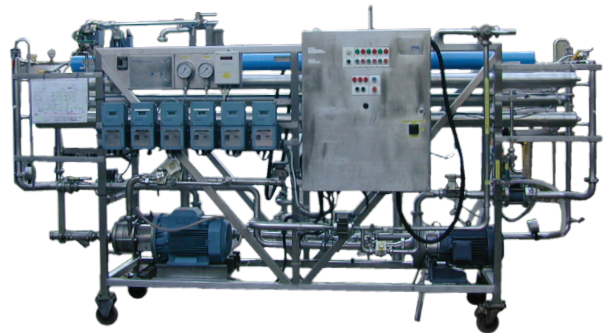
### Plant mechanical operating limit

- Max operating pressure: up to 15 bar
- Max pressure drop: 5 bar per module
- Max operating temperature: up to 70°C

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### Pumps, IEC Motors & VSD

- Feed Pump: Alfa Laval model LKH-114 with VSD controller (2 speed: 6 m<sup>3</sup>/hr @ 10.4 bar & 3 KW, 12 m<sup>3</sup>/hr @ 1.3 bar & 15 KW).
- Recirculation Pump per stage: Anema centrifugal pump with VSD controller. 14.4 m<sup>3</sup>/hr max flow, 11 KW motor, 6.2 bar max pressure.
- Pump Seal water: 3 off. Seal/cooling water through a 50 µm strainer @ 1 L/min, 0.5 bar max to all three pumps.
- All flows can be adjusted via the HMI screen.

### Flowmeter

- 6 independent Foxboro 8000 series model flowmeters are installed on the unit: one on the feed and retentate line, two installed on the recirculation loop and the other two on the permeate line from both stages.
- All flows are transmitted from individual sensors and display on each flow meters.

### Pressure & Temperature Sensor

- Feed pump outlet pressure, modules inlet pressure to both stages are constantly monitor via independent IFM pressure transmitter and display on the HMI screen.
- Outlet temperature from both stages are monitor via IFM thermometer sensor and display on the HMI screen.

### Pressure Control Valve

- Two hand operated diaphragm valves are installed on the retentate line (back pressure loop) to create the back pressure and control flow.

### Safety

- The unit is designed to the principles of Supply of Machinery (Safety) Regulations 1992 and are safe if operated in accordance with the procedures in the operating manual.

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