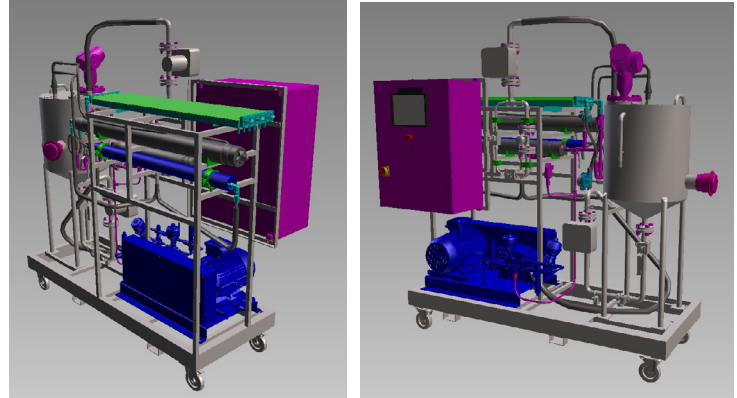


## BRO/BUF 11

A laboratory pilot plant designed for process development, membranes scale up testing, quality assurance and small-scale production.

A simple self-contained unit of minimum hold-up volume (15 Liters) with electric motor, CAT 1051 high pressure pump, membrane modules (both tubular and spiral), heat exchanger, pressure, level & temperature sensors, flowmeters, Siemens HMI & data recording unit and a feed tank (120 Liters). All mounted on a welded 304 stainless-steel framework.



### Application Range

Microfiltration (MF)	Ultrafiltration (UF)	Nanofiltration (NF)	Reverse Osmosis (RO)
up to 30 L/min	up to 30 L/min	18 – 22 L/min	18 – 22 L/min

Electrical Power Supply	Connections
400 Volts	Spiral: feed & permeate: 1/4" hose
3-phase (5 pins)	HE in/out cooling water: 1/2" OD hose
50 Hz. 32 Amp	Permeate & Shroud outlet: 1/2" OD hose
Motor rating: 7.5 KW	B1 & Single Tube Tester: Concentrate outlet UF/RO to feed tank: DN20 hose
	Spiral: Concentrate outlet to feed tank: DN20

### Size & Weight

Dimension			Unit & Package	Unit Only
Length	Height	Width		
241 cm	233 cm	106 cm	750 kg	600 kg

#### Framework

Welded stainless-steel frame fabricated from a high grade SS (AISI 304) for corrosion resistance, rigidity and lightness.

#### Module

##### 4 ft (1.2 m) B1 Module

Comprised of 18 perforated stainless-steel tubes in the form of a shell & tube, each tube fitted with a membrane element. The module is designed with a series flow end caps; connecting all 18 tubes in series.

- Membrane area: 0.88 m<sup>2</sup>
- Module weight: 14.4 kg
- Hold-up volume: Tubeside 2.8 L, Shroud-side 6.7 L
- Membrane tube ID: 12.7 mm

##### Single Tube Tester (1.2 m)

Designed for an economical and quick evaluation of membrane types, process separation and concentration tests.

- Comprised of 6 channels
- Up to three membrane types can be fitted at the same time, as each has its own permeate collection channel
- 0.3 m<sup>2</sup> of membrane area

##### Spiral Housing

Produced from a glass reinforced plastic pressure vessels and its used as housings for reverse osmosis membrane elements.

- 40" (1133 mm) length
- 2.5" diameter
- Membrane area subjected to membrane type selected

#### Heat Exchanger (HE)

##### Shell & Tube Type

##### Heat Exchanger 2 Ft (0.6 M)

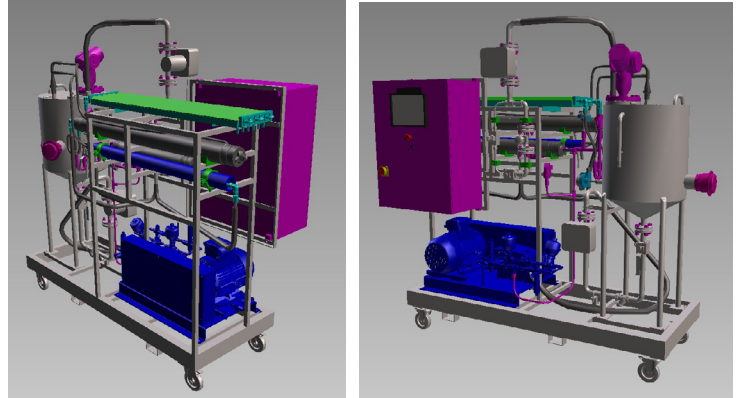
Process fluid is piped from the outlet of the pump through all 18 tubes in series within the heat exchanger while cooling water passes at low pressure (1-3 bar) through the shroud (shell) side. Cooling media flow could be up to 20 L/min.

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### Module tube side mechanical operating limit

#### B1 Module & Single Tube Tester

- Max operating pressure: up to 64 bar
- Max pressure drop: 10 bar
- Max operating temperature: up to 80°C

#### Spiral Module

- Max operating pressure: up to 68 bar
- Max operating temperature: 45°C

### Pump

- A CAT 1051 HP (piston type) is fitted.
- Capable of a flow rate between 6 – 38 L/min.
- Flow can be adjusted on the panel.

### Motor & Drive Guard

- 7.5 KW motor with 3 phase, 1 earth and 1 neutral (5 pins).
- TEFC foot mounted motor with simple adjustment for drive belt tensioning and alignment. A cover for the toothed belt drive between pump and motor is also fitted.

### Pressure Relief Valve

- The plant can be fitted with a pressure relief valve set at 70 bar for NF/RO or 20 bar for MF/UF operation.

### Pulsation Damper

Pulsation damper or accumulator is fitted to the pump outlet. This should be charged with Nitrogen as follow:

- 40 bar for RO.
- 6 bar or below for MF/UF operation (depending on the operating pressure).

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### Strainer

- A 40-micron strainer is fitted to the pipe work to protect the pump and modules.

### Flowmeter

- 2 Endress + Hauser flowmeters are installed on the unit: one on the feed line and the other on the retentate line. All flows are display on the HMI screen.

### Feed Tank, Immersion Heater & Level Indicator

- The unit is equipped with a built in 120 liters tank. Other components on the feed tank are: 2 off 3 KW immersion heaters with thermostat, Endress + Hauser level sensor transducer with value display on HMI screen and a space for cartridge filter.

### Pressure & Temperature Sensor. Pressure Control Valve

- Pump outlet pressure, module inlet and outlet pressure are transmitted from independent Endress + Hauser Pressure transducers to the HMI screen.
- Heat exchanger outlet & Feed tank temperature are transmitted from independent Endress + Hauser temperature transducers to the HMI screen.
- A hand operated needle valve for NF/RO operation or a diaphragm valve for MF/UF operation is used to create the back pressure.

### 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.