

PRESSURE FILTERS, TYPES TF/TFB

- FILTERS SUSPENDED SOLIDS
- REMOVES IRON AND MANGANESE
- NEUTRALIZES AGGRESSIVE CARBON DIOXIDE
- MANUAL OR AUTOMATIC PLANTS
- MODULES WITH DIFFERENT TYPES OF COATINGS
- STANDARD MODULES UP TO FLOW RATES OF 100 M³/H
- SPACE SAVING INSTALLATION
- REQUIRES LESS CIVIL ENGINEERING THAN GRAVITY FILTERING PLANTS



TFB-FILTER

COMPLETE WATER SUPPLY PLANTS

WATER SUPPLY PLANTS

In a complete water supply plant the filter fillings, filter size and ancillary equipment are dimensioned according to the composition of the raw water and the needed flow rate. EUROWATER makes water analysis as well as dimensioning of water supply plants with pressure filters.

DRINKING WATER TREATMENT

The requirements to the quality of drinking water are stipulated in national legislation. The limits for the contents of suspended solids, iron, manganese and aggressive carbon dioxide can be reached through treatment in a EUROWATER pressure filter.

EUROWATER PRESSURE FILTERS

The pressure filters types TF/TFB offer a broad range of variations according to operation, coating and design pressure. Through a similar design of the vessels for manually operated pressure filters, type TF, and automatically operated pressure filters, type TFB, a future automatization of a manual pressure filter is relatively simple.

WORKING PRINCIPLE

By aeration of the raw water iron and manganese precipitate enabling them to be collected on the filter media together with the mechanical impurities. The filter media are rinsed at regular intervals. The interval between the rinses depends on raw water impurity and water consumption.

AERATION UNIT

The aeration equipment consists of a compressor unit with or without pressure tanks.

RINSE PROGRAM

The rinse of the filter is optimized first with an air blow followed by a water rinse. The air blow is performed with an air blower and loosens the collected impurities from the filter media, thus making the subsequent water rinse more efficient. Normally clean water is used as rinse water for the pressure filter. It is supplied from the clean-water reservoir by a rinse pump. When after approximately 20 minutes the rinse program has been completed the plant is ready to go into operation again.

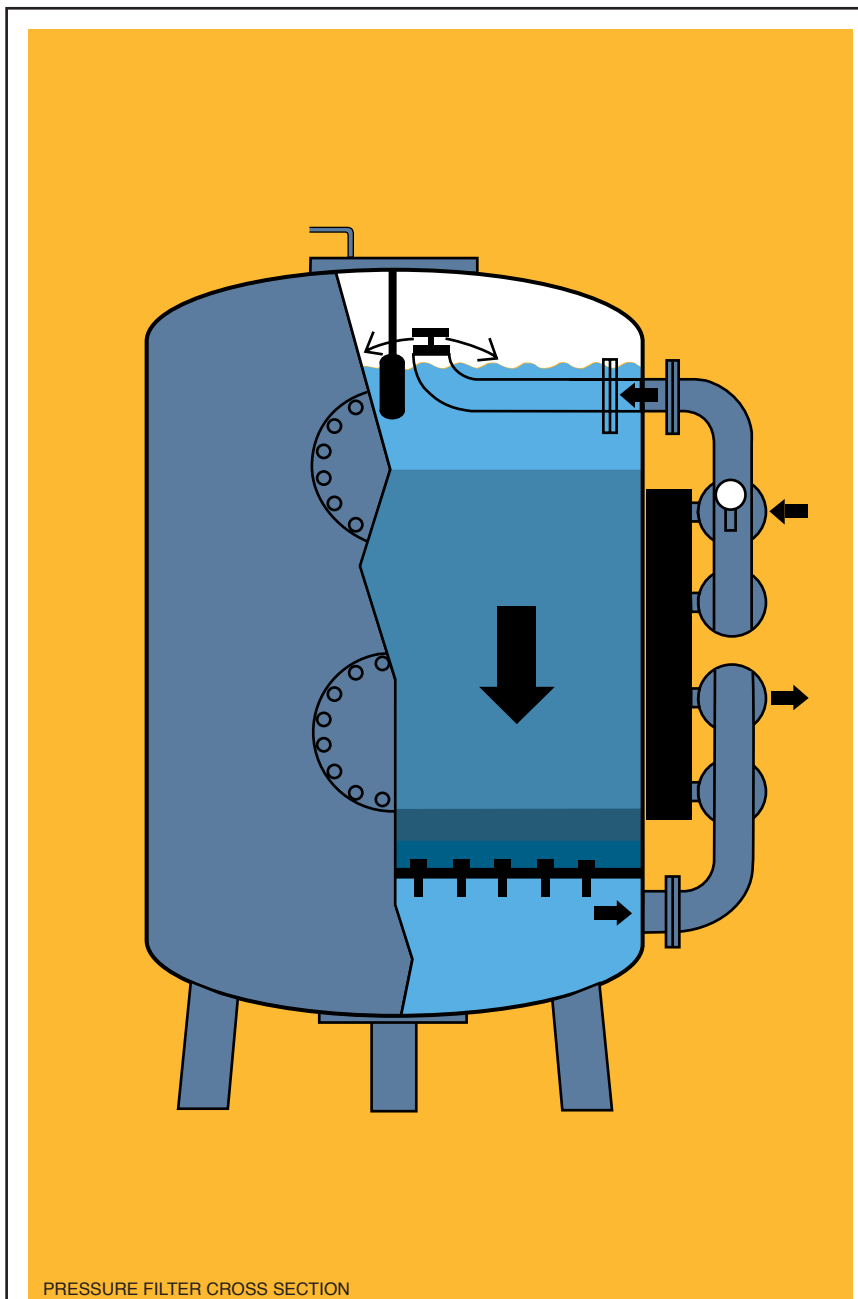
IRON AND MANGANESE REMOVAL

The filter media for iron removal have an excellent filtering efficiency. The filter media are easy to rinse and last for many years. For manganese removal a manganese treated catalytic filter medium is used.

NEUTRALIZATION

For neutralization a special filter medium that neutralizes the aggressive carbon dioxide in the raw water is used. Resulting from the neutralization, a protective layer is established on the inner surfaces of the plumbing system, protecting against chemical corrosion. Filter media are consumed during removal of carbon dioxide, thus making refilling necessary at regular intervals.

- FOR INDUSTRIAL WATER SUPPLIES
- FOR MUNICIPAL AND PRIVATE WATERWORKS
- MORE THAN FIFTY YEARS OF EXPERIENCE WITH MANUFACTURE, CONSULTANCY, AND PROJECTING



PRESSURE FILTER CROSS SECTION

SPECIAL APPLICATIONS

OTHER APPLICATIONS

EUROWATER pressure filters, types TF/TFB, have many possible applications and can be supplied in special versions for many different tasks. Our technicians are at your service with advice and dimensioning.

SURFACE TREATMENT

Many filtering projects imply heavy demands on the resistance to corrosion. EUROWATER offers a range of coatings that can stand aggressive media and high temperatures. This makes our pressure filter program applicable to a vast number of tasks.

MULTI-LAYER FILTER

A pressure filter with hydroanthracite and sand filling. Hydroanthracite has a large receptivity and the underlying sand layer functions as secondary filter. The filter is especially suited to collect flocculated and mucous particles.

CARBON FILTER

A pressure filter with activated carbon for removal of chlorine and collection of organic substances.

- FILTRATION IN COOLING AND HOT-WATER SYSTEMS
- FINAL FILTRATION OF INDUSTRIAL AND MUNICIPAL WASTE WATER
- RECYCLING OF PROCESS WATER
- DECHLORINATION OF WATER
- FILTRATION OF SEA WATER
- OTHER SPECIAL APPLICATIONS



EUROWATER pressure filter built into a container.

AUTOMATIC PRESSURE FILTER TYPE TFB

PRESSURE FILTER

The pressure filter consists of a filter tank with valve system and necessary armature. At the inside the filter is equipped with an automatic air vent and a distributor plate with corrosion-resistant distributors. The standard version of the tank is outside sandblasted and coated effectively with primer and plastic enamel.

PIPE SYSTEM

The pipe system is equipped with pneumatically regulated valves and is adjusted to the filter size and the installation conditions.

CONTROL PANEL

The control panel of the system is a fully electronic, 12 V, control unit. It comprises a rinse program section and a time control unit. The panel is designed to control up to four filter tanks.

PANEL SETTING

The control panel can be set to rinse at the days and hours at which it is desirable to backwash the filter. Potential free signals are available from the control panel. In case of increased water consumption or increased raw water impurity, the plant is easily reprogrammed without application of tools.



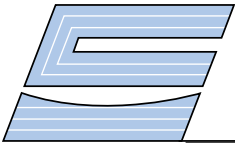
TF 5 CONTROL PANEL

An advanced control panel with a large number of built-in control functions. Among other things the panel has adjustable programs for both air blow and water rinse. The panel can control raw water pump, compressor, air blower and rinse water pump.

SPECIFICATIONS

Module TF/TFB	Dimensions' One-tank unit			Dimensions' Two-tank unit			Pipe system DN	Weight ² approx. kg
	Width mm	Depth mm	Height mm	Width mm	Depth mm	Height mm		
10	1900	2200	3000	3300	2200	3000	65	3030
12	2000	2300	3000	3500	2300	3000	65	3475
14	2100	2400	3000	3700	2400	3000	65	4230
17	2200	2500	3100	4000	2500	3100	80	5180
20	2300	2600	3100	4200	2600	3100	80	6080
25	2500	2800	3100	4600	2800	3100	80	7950
30	2600	2900	3200	4800	2900	3200	100	9080
35	2700	3000	3200	5000	3000	3200	100	10200
40	2800	3100	3200	5200	3100	3200	100	11435
50	3200	3400	3300	5900	3400	3300	125	16030
60	3400	3600	3400	6300	3600	3400	125	19255
75	3600	3800	3500	6800	3800	3500	150	22940
100	4000	4200	3600	7600	4200	3600	150	31855

- 1) required space for installation inclusive of normal free space.
- 2) weight inclusive of filter media and water.



EUROWATER

A GROUP OF CO-OPERATING EUROPEAN WATER TREATMENT SPECIALISTS

REVERSE OSMOSIS

EUROTEC SERIES 01, 02 & 03 REVERSE OSMOSIS PLANTS

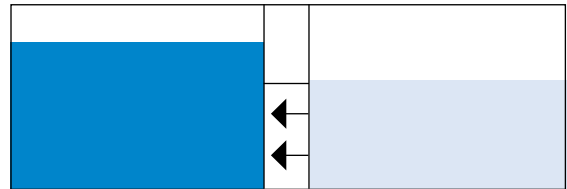
- DEMINERALIZED WATER WITHOUT ACID & CAUSTIC REGENERANTS
- REMOVES PYROGENS AND BACTERIA
- LOW OPERATING COSTS
- NO EFFLUENT NEUTRALIZATION REQUIRED
- NO HANDLING WITH HAZARDOUS REGENERANTS
- NO REGENERATION DOWN TIME
- ELECTRONIC QUALITY CONTROL
- CORROSION RESISTANT MATERIALS OF CONSTRUCTION
- COMPACT DESIGN



Type 01-3

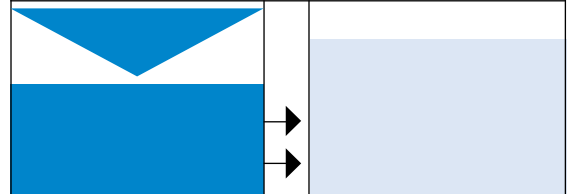
APPLICATION FIELDS

- HOSPITALS AND DIALYSIS CENTRES
- PUBLIC AND PRIVATE LABORATORIES
- PROCESS WATER FOR FOOD AND DRINK INDUSTRIES
- PROCESS WATER FOR PHARMACEUTICAL AND CHEMICAL INDUSTRIES
- PROCESS WATER FOR METAL FINISHING AND PAINT INDUSTRIES
- RINSE WATER FOR THE PRODUCTION OF ELECTRONICS, GLASS AND MIRRORS
- COOLING AND BOILER FEEDWATER
- FEEDWATER FOR HUMIDIFICATION



OSMOSIS

When a semi-permeable membrane separates two solutions with different salt concentrations, pure water from the low concentrated side will pass through the membrane to reach equilibrium in salt concentration on both sides.



REVERSE OSMOSIS

By applying pressure on the more concentrated solution, the water flow is reversed and pure water is forced through the membrane into the less concentrated solution.



Type 02-12



Type 03-21

REVERSE OSMOSIS PLANT

PRINCIPLE OF OPERATION

Pretreated water is pumped into the membrane housings along the membrane surface. Pure water is permitted to pass through the membrane while ionic, organic, colloidal and bacterial contaminants are swept away in concentrated solution. Consequently, a reverse osmosis system always creates two continuous exit streams: pure water (permeate) and brine (concentrate). Normally up to 80 per cent of the feedwater can be recovered as permeate.

DEMINERALIZATION

Salts are repelled from the surface of the membrane while water molecules are allowed to diffuse freely through the membrane creating a purified product stream. Higher valence ions (salts) are rejected to a greater degree. Average rejection of dissolved salts ranges between 98 and 99 per cent.

ULTRAFILTRATION

The mechanism for organic retention is different from the mechanism for salt rejection. Dissolved organic materials with a molecular weight over 200 daltons but also colloidal matter, bacteria, pyrogens and viruses are widely removed because of their size and geometry, i.e. they are physically too large to pass through the pores of the membrane.

PRETREATMENT

Proper pretreatment of the feedwater to a RO system is an essential factor for smooth long-term operation. Clogging of the membranes by suspended solids, scale-forming minerals and other impurities has to be prevented by appropriate measures. Hardness minerals can be removed in a softener, suspended solids in a mechanical filter while free chlorine can be removed in an activated carbon filter.

SYSTEM DESIGN

In order to protect the RO membranes against foulants a complete system usually consists of a softening plant and a re-

verse osmosis unit equipped with a pre-filter. An activated carbon filter has to be added if free chlorine is present in the feedwater. To further improve the water quality in terms of conductivity permeate can be polished downstream.

DOSING SOLUTION

Dosing of antiscaling agents is an alternative to softening. Antiscaling agents prevent salt precipitations on the membranes. The dosing solution can effect major economies with large plants. Local regulations and recipient conditions determine and limit the dosing solution.

POLISHING

Polishing of permeate in a mixed-bed unit (cf. special brochure) is normally required when high purity water is needed.

PROJECTING

Besides the reverse osmosis unit, EURO-WATER has a complete programme for pretreatment of RO feedwater and post-treatment of permeate. Based on a water analysis or on measurements on the spot, a complete system can be designed.

EUROTEC UNIT

Softened water is pre-filtered (1-5 µm) in a cartridge type filter or in a filter with filter bag and flows through an inlet solenoid valve to the pump. A high-pressure pump made of stainless steel drives the water through the membranes. The membranes of series 01 and 02 are mounted in stainless steel pipes whereas series 03 has pressure pipes of metal finished steel. Permeate and concentrate streams are led through flow meters to outlet and drain connections, respectively. All connections are made of pressure hoses or PVC pipes. A comprehensive set of interlocks is provided to control and protect the equipment, e.g. pre-rinse, quality rinse, post-rinse, quality monitoring, low pressure cut-off. The EUROTEC unit is skid-mounted and ready for installation.

CONTROL PANEL

The electronic control panel can be programmed according to actual demand. The duration of pre-rinse, quality rinse, and post-rinse can be set individually. The conductivity meter continuously indicates the quality of the permeate measured in µS/cm. Special features include various control and alarm lamps as well as potential-free contacts for external signals and for remote alarm. The control panel operates on low voltage (12 V).

QUALITY RINSE

After a period of standstill, the conductivity of the water in the membranes increases, i.e. the quality decreases. A restart of the unit triggers a quality rinse to drain until the permeate has reached the present quality limit. When the desired conductivity is reached the unit automatically switches to service.

POST-RINSE

When water consumption is interrupted the high-pressure pump stops working and the membranes are rinsed with pretreated water at normal waterworks pressure for a preset number of minutes. This post-rinse reduces the risk of insoluble salt precipitations and minimizes algae and bacteria growth during standstill.

CLEANING

EUROTEC reverse osmosis units are equipped with connections for a cleaning and sterilization device. Membranes are cleaned and disinfected periodically in order to avoid malfunctions of the plants due to high bacterial count and/or precipitations on the membrane surface. The frequency of cleaning depends on the composition of the raw water and on the type of pretreatment applied to the feedwater. Cleaning and sterilization agents are effected by circulating cleaning or sterilization agents through the membranes. A cleaning and sterilization unit can be offered as optional extra.

CAPACITY

The unit capacity depends upon pressure, salt content and temperature of the feed-water. The capacity increases with increasing pressure and temperature and decreasing salt content. Capacities for individual membrane elements may vary by +/- 15 per cent.

QUALITY

An EuRotec reverse osmosis unit will usually retain 95 to 99 per cent of all inorganic dissolved solids and more than 90 per cent of all organic contaminants. Carbonic acid, however, will penetrate through the membrane into the permeate.

MEMBRANES

The membranes are of Thin Film Composite (TFC) type and packed in a spiral wound module configuration. TFC membranes have high salt rejections and good performances under wide-ranging pH and temperature conditions. They are not degradable by microorganism and hold their productivities over long periods of time.

New membrane types are developed all the time. EUROWATER continuously optimizes the plant range in accordance with the requirement of the individual customers. Usually, low-energy membranes are the best solution when both operating costs and water quality are considered. Several membrane types of various makes can be employed in our flexible plants without more ado.

PLANTS CONNECTED IN SERIES

To further improve water quality two plants can be connected in series so that the second plant further treats the water from the first plant. Plants connected in series will be built together to a so-called double-pass plant.

SERIES 01. 1-5 MEMBRANES

The membranes are mounted in vertical pressure vessels made of stainless steel (AISI 304). Each membrane is housed in one vessel giving a compact, spacesaving design. To reduce the risk of fouling the membranes, the unit is equipped with an adjustable recirculation facility.

SERIES 02. 6-24 MEMBRANES

The horizontally mounted pressure vessels contain two membranes each. Placing two membranes in one pressure vessel means reduced pressure loss and consequently increased capacity.

SERIES 03. 6-24 MEMBRANES

This series is designed for flow rates from 5 to 30 m³/hour. The plants are equipped with membranes of eight inches unlike series 01 and 02 that contain membranes of four inches. Each pressure pipe has three membranes of eight inches.

SPECIAL PLANTS

Plants with other capacities and choice of material are designed according to demand.

SPECIFICATIONS

TYPE	STANDARD CAPACITY ¹⁾ m ³ /hour	PUMP-MOTOR ²⁾ kW	CONNECTIONS				FRAME MEASURES ³⁾		
			Inlet PVC	Outlet DN/mm PVC	Drain DN/mm PVC	Rinse DN/mm PVC	Height mm	Width mm	Depth mm
01-1	0,35	2,2	Rp 3/4	20/25	20/25	25/32	1620	800	400
01-2	0,70	2,2	Rp 3/4	20/25	20/25	25/32	1620	800	400
01-3	1,05	2,2	Rp 3/4	20/25	20/25	25/32	1620	800	400
01-4	1,40	2,2	Rp 3/4	20/25	20/25	25/32	1620	1140	400
01-5	1,75	2,2	Rp 3/4	20/25	20/25	25/32	1620	1140	400
02-6	2,1	4,0	DN 32/40 mm	25/32	25/32	40/50	1560	2500	550
02-8	2,8	4,0	DN 32/40 mm	25/32	25/32	40/50	1560	2500	550
02-10	3,5	4,0	DN 32/40 mm	25/32	25/32	40/50	1950	2500	550
02-12	4,2	4,0	DN 40/50 mm	25/32	25/32	40/50	1950	2500	550
02-16	5,6	5,5	DN 40/50 mm	40/50	25/32	40/50	1560	2650	700
02-20	7,0	5,5	DN 40/50 mm	40/50	25/32	40/50	1950	2650	700
02-24	8,4	7,5	DN 40/50 mm	40/50	25/32	40/50	1950	2650	700
03-6	8,4	11,0	DN 40/50 mm	40/50	25/32	40/50	1700	4000	1100
03-9	12,6	11,0	DN 40/50 mm	40/50	25/32	40/50	1700	4000	1100
03-12	16,8	15,0	DN 50/63 mm	50/63	25/32	50/63	1700	4000	1100
03-15	21,0	15,0	DN 50/63 mm	50/63	25/32	50/63	1700	4000	1100
03-18	25,2	18,5	DN 50/63 mm	50/63	40/50	50/63	2050	4000	1100
03-21	29,4	22,0	DN 50/63 mm	50/63	40/50	50/63	2050	4000	1100
03-24	33,6	22,0	DN 50/63 mm	50/63	40/50	50/63	2050	4000	1100

1) The standard capacities apply to low energy membranes at a temperature of 10°C and a salt content in the inlet water of 500 mg/l. Also see the section CAPACITY.

2) Wiring: 3x400 V, 50 Hz. The stated pump power is for your guidance. The actual power will often be less.

3) Dimensioned sketch with exact installation dimensions is available.