



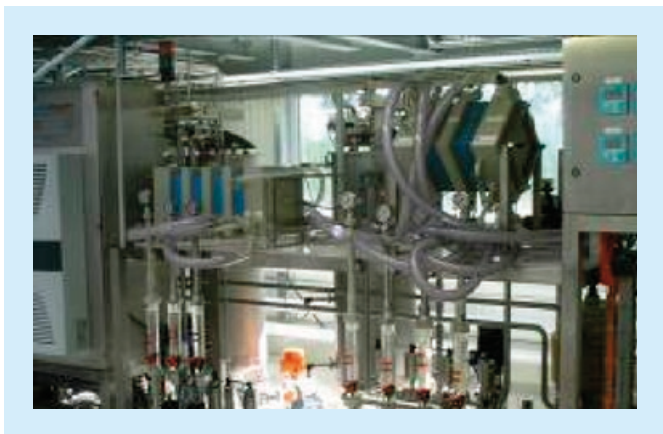
# Electro-Membrane Applications

## fumatech® electro-membrane processes

FuMA-Tech®, that stands for „Functional Membranes and Plant Technology“, is a leading producer of ion-exchange membranes, modules and systems for different electrochemical applications such as Electrodialysis, Bipolar Membrane Technology, Membrane electrolysis and Donnan Dialysis.

Characteristically of our membrane plants are their modular design and construction, mostly with automatic operation and user-friendly features.

We produce membrane modules, design and build complete units and plants for water treatment processes.



### Module FT-ED-100

This module type is a multifunctional device for lab and pilot scale with 2, 3 and 4 loop processing.



### Module FT-ED-200

This pilot scale module type allows the operation near the flow length of the technical scale. The 2 chamber equipment is predestined for diffusions dialysis applications at high packing density and easy assembling.

## fumatech® modules for electro-membrane processes

FuMA-Tech® supplies not only the required membranes for membrane electrolysis but also professional multi-chamber membrane modules (electrolyzer) ranging from laboratory and pilot scale to industrial plants. All these modules offer high robustness plus excellent mechanical, thermal and chemical stability, superior internal tightness and can operate at reversed polarity as well. They are available as compact units at attractive cost to performance ratios.



### Module FT-ED-40

This module is a cost saving 2 loop lab scale type for preliminary tests and membrane characterisations.



### Module FT-ED-320

This high tech pilot scale membrane module is available for 2, 3 and 4 loop processing.

## FuMA-Tech® Lab and Pilot scale Modules:

modul type			FT-ED-40	FT-ED-100	FT-ED-200	FT-ED-320
application			Lab-scale ED, EDR, EDBM	Lab-scale ED, EDR, EDBM	Pilot-scale ED, EDR, EDBM	Pilot-scale ED, EDR, EDBM
effective membrane area		m <sup>2</sup>	0.0036	0.010	0.02	0.032
effective membrane size	B	mm	40	100	63	180
	L	mm	90	100	320	180
membrane size	B	mm	60	160	100	250
	L	mm	130	160	458	250
number of loops			2	4	2	4
number of spacers	min	pcs	2	4	2	4
	max	pcs	40	80	500	400
total installed membrane area	max	m <sup>2</sup>	0.072	0.4	5.0	6.4
number of segments		pcs				4
flow per chamber		l/h	7	18	12	32
pressure drop per segment		bar	0.7	0.8	2	1.6

### Module FT-ED-1750

The FT-ED-1750 is a high tech membrane module for technical scale with up to 3 loops and segments stepping. The module is equipped with a hydraulic press and rod electrodes for easy replacement of the membranes and spacers.

### Module FT-DD-4000

This module is a cost optimised production scale type for diffusion dialysis with an outstanding cost performance ratio.



Module FT-DD-4000

## FuMA-Tech® Product scale Modules:

modul type			FT-ED-1750	FT-ED-1750-3	FT-DD-1750	FT-DD-4000
application			Product-scale ED, EDR, EDBM	Product-scale EDBM	Product-scale DD	Product-scale DD
effective membrane area		m <sup>2</sup>	0.175	0.175	0.175	0.4
effective membrane size	B	mm	456	456	456	458
	L	mm	383	383	383	874
membrane size	B	mm	505	505	505	505
	L	mm	500	500	500	1000
number of loops			2	3	2	2
number of spacers	min	pcs	4	6	4	4
	max	pcs	320	150	700	500
total installed membrane area	max	m <sup>2</sup>	28	8.75	122.5	200
number of segments		pcs	3	3	4	4
flow per chamber		l/h	82	82		
pressure drop per segment		bar	3	3	0.2	0.4

## fumatech® spacers for electro-membrane processes

FuMA-Tech® also supplies required spacers for all types of modules. Two different material types are available. The standard PVC/PET type could be used in most common applications with a pH range from 0 to 10. PE/PVDF type spacers are recommended for alkaline conditions with a pH range from 5 to 14. Both types of spacers have a thickness of 0.5 mm.



Spacers for module FT-DD-4000 and FT-ED-1750.

## fumatech® plant technology

Customer orientated, FuMA-Tech® offers the complete process engineering, construction and initial operating - beginning from lab scale up to turn-key production plants. A high quality and flexible service is also provided by our company.



Turn-key equipment on customers demand for operating our different modules.



Peripheral devices such as pumps, pressure sensors and flowmeters.



Control panel with touch screen for easy display and operating.



Work space including module-connectors and valve access.



## The company

Focusing on water as the basis of all forms of life, and energy as the basis for a higher quality of life, FuMA-Tech® „Functional Membranes and Plant Technology“, combines the important tasks of providing energy and water. The company is engaged in the field of fuel cell technology and membrane separation technology, particularly for the treatment of aqueous solutions.

FuMA-Tech® draws its particular strengths as a leading producer of ion-exchange membranes from its membership in the BWT Best Water Technology - Group.

FuMA-Tech® is committed to develop new products that will accelerate progress in polymer electrolyte fuel cells.

The company is both competent and competitive as a leading supplier of polymers and membranes for manufacturing of membrane electrode assemblies.

The high performance membranes are the heart of a proton exchange membrane (PEM) fuel cell stack.

FuMA-Tech® produces and develops

- polyelectrolytes (**fumion**® ionomers),
  - proton conductive membranes (**fumapem**® membranes) and
  - separation membranes (**fumasep**® membranes)
- based on proprietary technology and designed for high precision mass manufacturing.

**fumasep**® FAS / FKS  
**fumasep**® FAB / FKB

**fumasep**® FBM  
**fumasep**® FAD  
**fumasep**® FAP  
**fumasep**® FAA  
**fumasep**® FAM / FKM

standard ion exchange membranes for Electrodialysis (ED)  
high performance ion exchange membranes for Electrodialysis (ED), Electrodialysis with reverse polarity (EDR) and Electrodialysis with bipolar membranes (EDBM)  
bipolar Membrane for Electrodialysis with bipolar membranes (EDBM)  
special membrane for Donnan Dialysis (DD)  
chlorine and oxidation stable  
alkaline stable  
microheterogeneous membranes for electrodialysis, desalination and electrocoating applications

# BWT – The Water Company

The Best Water Technology Group was formed in 1990 and today is Europe's leading water technology company. The goal of our 2,700 employees in 80 subsidiaries and associates is to provide private, industrial, business, hotel, hospital and municipal customers with innovative, ecological and efficient technologies that deliver maximum safety, hygiene and health in their daily contact with the elixir of life, water.

BWT offers state-of-the-art water treatment technologies and services for drinking water, pharma water, process water, heating water, boiler water, cooling water and water for air-conditioning systems as well as swimming pool water. For the technological superiority in all areas of water treatment, the international BWT innovation centers continuously research, develop and optimize processes for filtration, filter media, ion exchange systems for demineralization, softening, decarbonisation, membrane technologies (microfiltration, ultrafiltration, nanofiltration, reverse osmosis), pure steam generators, high purity water distills UV systems, ozone generators, ion exchange membranes, electrolysis systems, electro dialysis, electrodeionisation, chlorine dioxide generators and metering pumps which are used throughout the world to achieve excellent water quality.

Tens of thousands of service employees, plumbers, planners, architects and sanitation experts constitute the BWT water partner network. Whether at the entrance of the water pipe into a building (at the "Point of Entry") or at the tapping point ("Point

of Use"), BWT products "made in Europe" have proven their quality million times. With new table water filters for preparing tea or coffee, filters for optimizing water for coffee machines, water filters for baking and steam ovens and vending machines, under-the-sink particle-filters as well as micro-filters, water dispensers, reverse osmosis and UV devices BWT also offers compact and innovative products for end consumers for best water quality.

With unique high efficiency membranes for fuel cells and batteries BWT is working for a cleaner energy supply of the 21<sup>st</sup> century.

Employees in Research & Development work on new processes and materials using state-of-the-art methodologies targeting to develop ecological, at the same time efficient products. The reduction of energy consumption of products and minimization of CO<sub>2</sub>-emissions forms a key issue for new and further development. Ecological, economical and social responsibility and the employment of state-of-the-art technologies as well as permanent product evolution contribute significantly to growing the company and the reputation of the market-leading regional brands BWT, HOH, Permo and Christ Aqua as well as Christ Aqua Pharma & Biotech.

BWT – The Water Company - is our vision to provide our customers and partners with the best products, systems and technologies and services in all areas of water treatment.

## BWT – The Leading International Water Technology Group.

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