



**Q-SEP<sup>TM</sup>**

**HOLLOW FIBER ULTRAFILTRATION**



**QUA** is a manufacturer of advanced membrane products for water, wastewater and water reuse applications. Extensive R&D activities for over a decade have resulted in a range of cutting edge membrane products such as hollow fiber ultrafiltration modules (**Q-SEP**) and fractional electrodeionization stacks (**FEDI™**).

The **Q-SEP** ultrafiltration fibers and modules are manufactured in a state-of-the-art environmentally controlled manufacturing facility with continuous online monitoring to maintain consistent quality.



### About Ultrafiltration

Ultrafiltration (UF) is a membrane process used to remove suspended solids, colloidal matter, high molecular-weight substances, bacteria and viruses from various feed water sources. UF membranes can achieve a low and consistent silt density index (SDI) and are often used as pretreatment for reverse osmosis using surface water, seawater and biologically treated wastewater as feed source. **Q-SEP** UF membranes incorporate high strength hollow fibers that deliver superior performance without the risk of fiber breaks. **Q-SEP** UF membranes are made from a hydrophilic polyether sulfone (PES) material with excellent low fouling characteristics. These hollow fiber membranes operate under a pressurized inside-out flow configuration for superior performance.

**Q-SEP** hollow fiber UF membranes offer reliable removal of turbidity, microorganism and viruses. Turbidity can be reduced to less than 0.05 NTU. Typically 5-log removal for bacteria, giardia and cryptosporidium and a 4-log removal for viruses can be achieved.



**Q-SEP** modules contain an advanced ultrafiltration membrane prepared by an innovative cloud point precipitation method (patent pending). This method ensures a very uniform pore size distribution and high pore density in the membrane. As a result the product water quality from **Q-SEP** modules is significantly better than the quality from conventional UF modules at a very low operating pressure.

The fibers in the **Q-SEP** module are held firmly in place which reduces the stress on the fibers even at high flow velocities. Uniform fiber packing limits the pressure drop variation within the module and prevents localized high fouling conditions. Unique end cap sealing design allows for high pressure operation and ease of assembly.

**Q-SEP** UF modules can be used as dead-end filtration or in cross flow mode. The membranes are available with 0.8 mm ID fibers suitable for feed water with low turbidity and 1.2 mm ID fibers suitable to treat water with higher turbidity.

#### **Q-SEP UF Features**

- Superior module design
- Consistent pore sizes
- Uniform membrane fibers
- High porosity along the entire length of fiber
- Quality checks to ensure integrity of individual fibers prior to module assembly

#### **Advantages of Q-SEP UF over Conventional Media Filtration**

- Improved filtrate quality
- SDI typically less than 1
- Removal of virus, bacteria and germs
- Removal of microbiological matter
- Removal of colloidal matter
- No need to add coagulant chemicals for most applications
- Improvement of downstream RO performance
- Consistent treated water quality irrespective of changes in feedwater quality

#### **Applications of Q-SEP UF**

- Pretreatment to reverse osmosis system (brackish and seawater applications)
- Purification of surface and well water for potable applications
- Filtration of industrial water
- Wastewater recycle and reuse



# Module Specifications

## Module Details

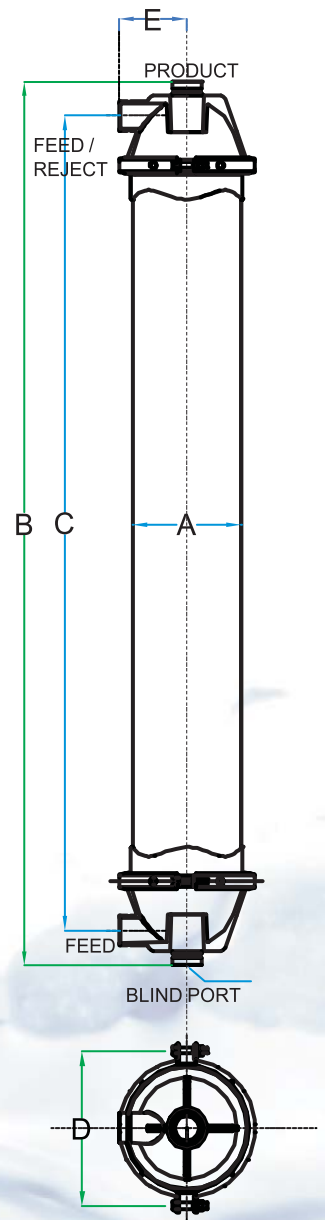
Parameter	Description / Information
Configuration	Self encapsulated hollow fiber ultrafiltration membrane module (inside-out)
Operating Mode	Dead-end or Cross flow, Backwashable
Module mounting	Vertical
Nominal Membrane pore size	0.02 micron

## Q-SEP Modules 0.8 mm

Product Data		Q-SEP 4508	Q-SEP 6008
Membrane area	m <sup>2</sup> / ft <sup>2</sup>	45 / 484	60 / 645
Filtrate flow rate minimum	m <sup>3</sup> /hr / gpm	2.25 / 9.9	3.0 / 13.2
Filtrate flow rate maximum	m <sup>3</sup> /hr / gpm	6.75 / 29.7	9.00 / 39.6
Fiber Inside diameter	mm / inch	0.8 / 0.03	0.8 / 0.03
Fiber Outside diameter	mm / inch	1.2 / 0.05	1.2 / 0.05
<b>Module Dimensions</b>			
Diameter (A)	mm / inch	225 / 8.85	225 / 8.85
Length – with end cap (B)	mm / inch	1803 / 70.98	2148 / 84.56
Length – feed connections (C)	mm / inch	1662 / 65.43	2007 / 79.01
Distance – width (D)	mm / inch	316 / 12.44	316 / 12.44
Distance – feed to center (E)	mm / inch	140 / 5.51	140 / 5.51
Module Weight	kg / lbs	35.3/77.4	47.4/103.9

## Q-SEP Modules 1.2 mm

Product Data		Q-SEP 3412	Q-SEP 4512
Membrane area	m <sup>2</sup> / ft <sup>2</sup>	34 / 365	45 / 484
Filtrate flow rate minimum	m <sup>3</sup> /hr / gpm	1.7 / 7.48	2.25 / 9.9
Filtrate flow rate maximum	m <sup>3</sup> /hr / gpm	5.1 / 22.45	6.75 / 29.7
Inside diameter	mm / inch	1.2 / 0.047	1.2 / 0.047
Outside diameter	mm / inch	1.9 / 0.08	1.9 / 0.08
<b>Module Dimensions</b>			
Diameter (A)	mm / inch	225 / 8.85	225 / 8.85
Length – with end cap (B)	mm / inch	1803 / 70.98	2148 / 84.56
Length – feed connections (C)	mm / inch	1662 / 65.43	2007 / 79.01
Distance – width (D)	mm / inch	316 / 12.44	316 / 12.44
Distance – feed to center (E)	mm / inch	140 / 5.51	140 / 5.51
Module Weight	kg / lbs	35.9/78.7	48/105.2



## Technical Information

### Operational Instructions

Filtrate flux range	50 to 150 l/m <sup>2</sup> h (30 to 90 gfd)
Maximum feed pressure	5.0 bar (70 psi)
Trans-membrane pressure	0.3 to 1.4 bar (5 to 20 psi)
pH range	2 to 12
Typical instantaneous chlorine tolerance	100 to 200 ppm
Maximum operating temperature	45°C (113°F)
Typical feed turbidity	0.8 mm ID: 25 NTU 1.2 mm ID: 50 NTU
Backwash flux range	150 to 300 l/m <sup>2</sup> h (90 to 180 gfd)
Backwash feed pressure	0.7 to 2.1 bar (10 to 30 psi)
Backwash frequency & duration	Every 15 - 45 minutes for 30 - 60 seconds

### Chemically Enhanced Backwash

Estimated frequency (conditions)	Every 1 to 10 days of operation (depending upon feedwater conditions)
Duration	20 minutes
CEB chemicals	NaOCl (100 - 200 ppm), NaOH (pH: 11-12), HCl (pH: 2-3), H <sub>2</sub> O <sub>2</sub> , Citric acid.

### Module Characteristics

Membrane material	Hydrophilic PES
Housing material	UPVC
End cap material	GRP





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