AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Polymeric Membrane System

Aqua MultiBore® P-Series

Membrane Fibers

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

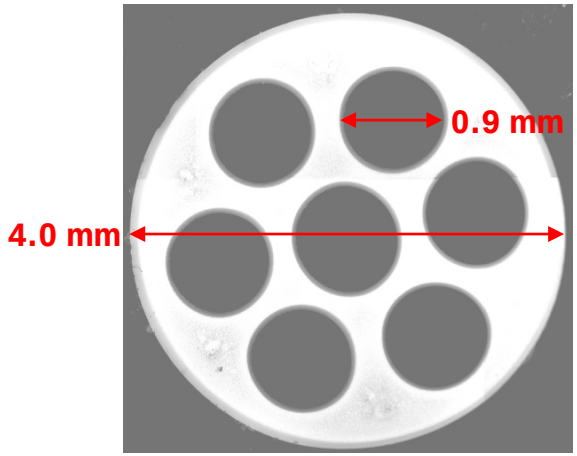
- (7) capillaries in one fiber
- Made from one material in one process step
- 0.02 micron pores in separation layer
- Superior fiber strength = ***no fiber breaks***

Aqua MultiBore® P-Series

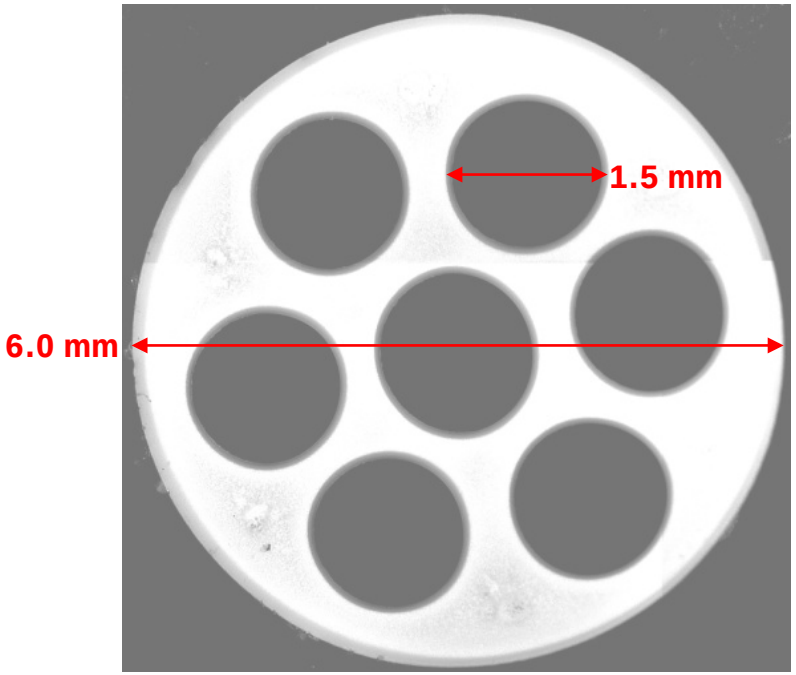
Membrane Fibers

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

- Bore diameter is wider than other low-pressure membranes
- Large diameter fiber good for high-solids applications



>50 NTU continuous maximum

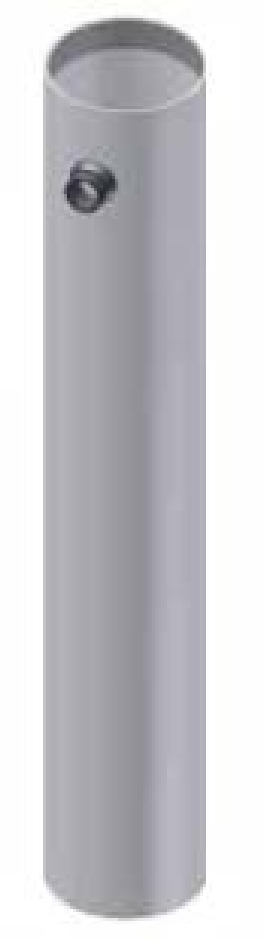


50-300 NTU continuous maximum

Aqua MultiBore® P-Series

Membrane Module

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company



	Short Module	Standard Module
Material	Polyvinyl Chloride (PVC)	
Diameter	250 mm (9.8 inches)	250 mm (9.8 inches)
Height	1,486 mm (58.5 inches)	1,720 mm (67.7 inches)
Surface Area with 0.9 mm fibers	60 m^2 (646 ft^2)	70 or 80 m^2 (654 or 861 ft^2)
Surface Area with 1.5 mm fibers	40 m^2 (431 ft^2)	50 m^2 (538 ft^2)

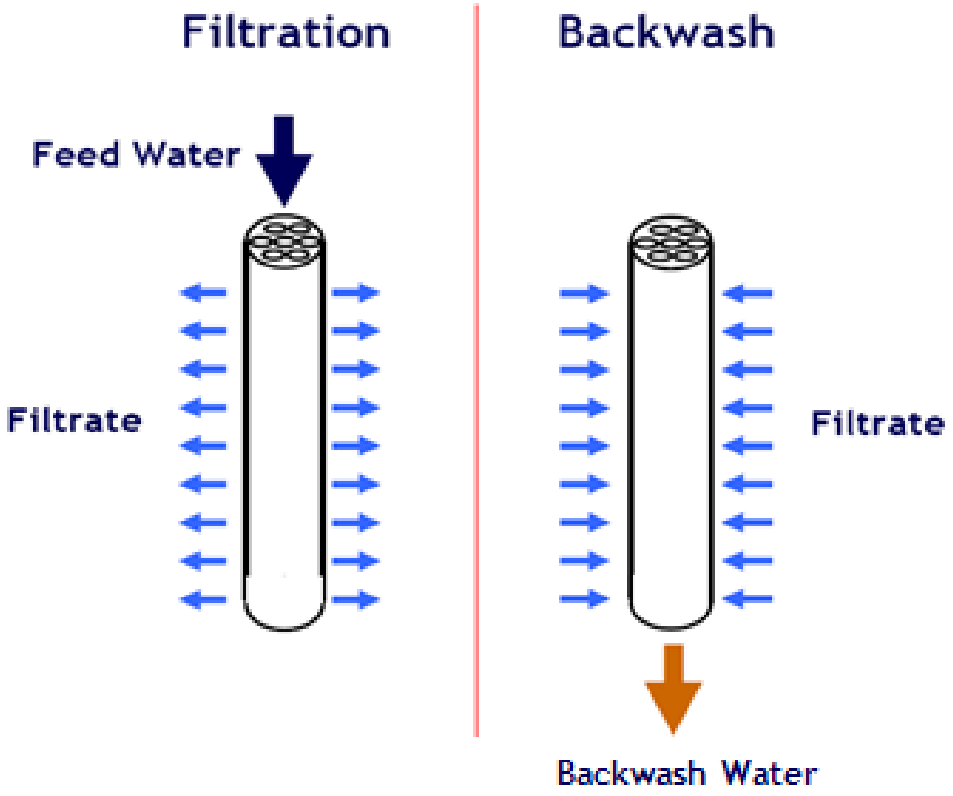
Aqua MultiBore® P-Series

Membrane Features

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Inside-out filtration

- Solids stay inside bores
- Low backwash flow gives high velocity without air
- Can handle high solids excursions



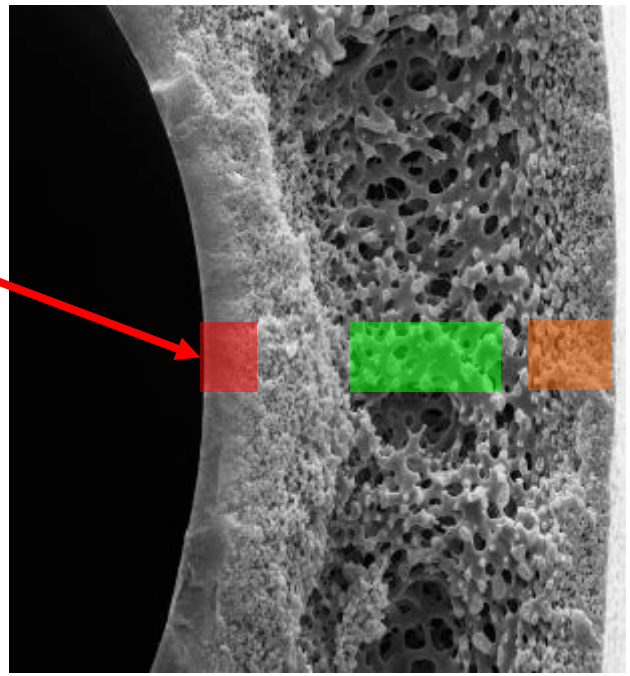
Aqua MultiBore® P-Series

Membrane Features

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Thin filtration layer

- Very little pressure drop through rest of membrane
- Even flow through all 7 bores



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Membrane System Features

- Compact and expandable
- External installation
  - Higher fluxes
  - No basins or lifting equipment
  - Accessible

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Advantages Over Other Polymeric Membranes

- Very Few Fiber Repairs
- Best Warranty
- Less Power Usage
- Many Installations

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Very Few Fiber Breaks

Other polymeric membranes:

- Black & Veatch studied 16 drinking water plants with low-pressure membranes
  - Averaged 9 multi-fiber repairs per MGD
  - Expensive 20-year repair costs = 2.5 – 8.4% of equipment cost

Our polymeric membrane:

- 6 repairs in over 200 installations in 15 years
- = 0.01 repairs per MGD!

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Best Membrane Warranty

Aqua-Aerobic standard warranty:

If a single fiber breaks in the first 5 years…

- Aqua will replace the entire 2,000-fiber module free of charge

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Less Power Usage

Typically less than 0.035 kwh/m^3:

- Inside-out filtration doesn't require air scouring
- Uniform pores and thin filtration layer keep TMPs low
- Alternating flow pattern allows less-frequent backwashing

Aqua MultiBore® P-Series

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Many Installations

- Installations in the U.S. and Puerto Rico
  - 6 drinking water plants
  - 1 domestic wastewater plant
  - 2 industrial facilities
  - 200K m^3/day (53 MGD) total capacity
  - First installation in 2011

Aqua MultiBore® P-Series

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Many Installations

- Installations Worldwide ≥ 0.25 MGD
  - 71 drinking water plants
  - 9 domestic wastewater plants
  - 134 industrial facilities
  - with 2.3M m^3/day (607 MGD) total capacity
- More than 500 smaller installations

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Water Plant Retrofits

- Butler, MO (3 MGD)
  - Replaced (108) modules in 2014
- Byesville, OH (2.25 MGD)
  - Replaced (3) 112-module trains in 2014
- Garden City, MO (0.15 MGD)
  - Replaced (16) modules in 2014
- Two Rivers, WI (3 MGD)
  - Replaced (48) modules in one of five trains in June 2017

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua MultiBore® P-Series

Polymeric Membrane System