

# X-FLOW PRODUCT PORTFOLIO

27 MAY 2016

**SEMINAR ON X-FLOW ULTRAFILTRATION MEMBRANES - ISTANBUL**

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PENTAIR



PENTAIR

X-Flow

# GLOBAL CAPABILITIES AND RESOURCES

~30,000

EMPLOYEES

6

CONTINENTS

\$6.4 Billion

ANNUAL REVENUE

~100

MANUFACTURING  
FACILITIES

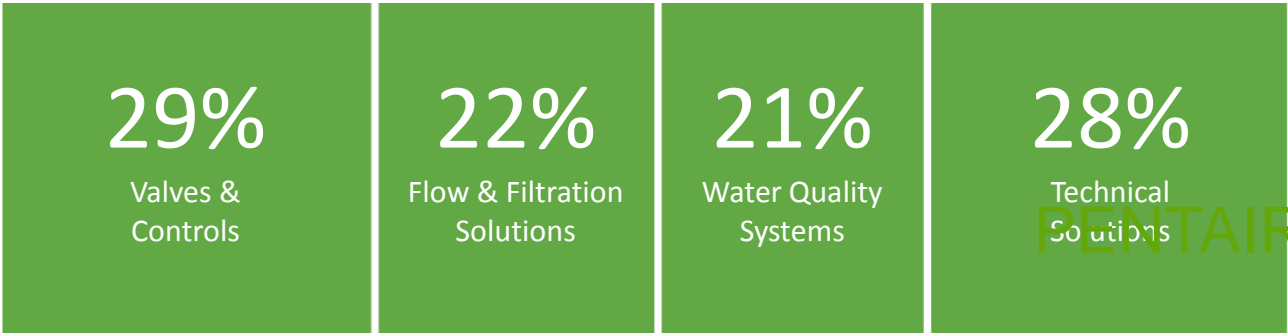
500+

PRODUCT  
LINES

60+

SERVICE  
CENTERS

# FOUR GLOBAL OPERATING SEGMENTS



**\$6.4B**

**2015 SALES**



2015 SALES BY VERTICAL

- 30** Residential & Commercial
- 27** Industrial
- 25** Energy
- 10** Food & Beverage
- 08** Infrastructure



2015 SALES BY REGION

- 54** US & Canada
- 22** Developing
- 18** Western Europe
- 06** Other developed

# ADVANCED FILTRATION



# ADVANCED FILTRATION & SEPARATION

## Pentair Oil & Gas Separation

Provides advanced technology for the high performance separation of solids, liquids & gases.

Manufacturing in Houston, TX, USA

## Pentair Advanced Filtration

Advanced membrane filtration is our business with two globally recognized product brands: **X-Flow** & **Codeline**


Manufacturing in Enschede, NL and Goa, IN

-  Manufacturing facility
-  Sales & service
- 

# ADVANCED FILTRATION BRANDS

*Advanced membranes are our business. We help equipment manufacturers, engineering and construction contractors to exceed expectations with membranes that make the difference, even in the most challenging tasks and conditions.*

## Our product brands:



**X-FLOW**

Capillary & tubular membranes:  
MF, UF, NF  
Founded in 1984  
Production in Enschede, NL  
**>200,000 vessels in operation**



**CODELINE**

Pressure vessels for:  
UF, NF & RO  
Founded in 1976  
Production in Goa, IN  
**>600,000 vessels in operation**

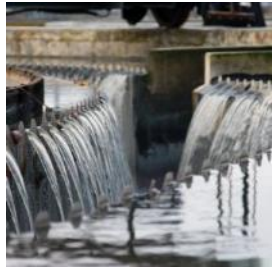




# X-FLOW



# BROAD SCOPE OF MEMBRANE APPLICATIONS



## MUNICIPAL WASTEWATER TREATMENT

- Effluent polishing
- Leachate treatment



## INDUSTRIAL WASTEWATER TREATMENT

- Acid Mine Drainage Treatment
- Aerobic Biological WWT
- Anaerobic Biological WWT
- Biogas Recovery
- Color/Organics Removal
- Produced Water Treatment
- Effluent Polishing



## PROCESS WATER PRODUCTION

- Algae Bloom Guarding
- Color/Organics Removal
- Injection Water Production
- Boiler Feed Water Production
- High Solids Water Treatment
- Pretreatment (SW)RO/Desal
- Ultrapure Water



## POTABLE WATER PRODUCTION

- Algae Bloom Guarding
- Color/Organics Removal
- Emergency Water Supply
- Infection control
- High Solids Water Treatment
- Pretreatment (SW)RO/Desal



## IRRIGATION WATER PRODUCTION

- Pretreatment (SW)RO/Desal
- Algae Bloom Guarding



## FOOD & BEVERAGE TREATMENT

- Wine Filtration
- Juice Filtration



# PRETREATMENT (SW)RO – MARKET LEADER

## Global UF/MF membrane suppliers in plants larger than 10,000m<sup>3</sup>/d

Membrane supplier	Market share
Pentair X-Flow	33.4%
Asahi	22.5%
Hyflux	13.0%
GE	11.5%
Siemens Memcor	6.3%
Inge	3.6%
Metawater	2.6%
Toray	1.9%
Koch	1.6%
Others	2.6%

## Global UF/MF membrane suppliers in desalination plants larger than 10,000m<sup>3</sup>/d

Membrane supplier	Market share
Pentair X-Flow	46.7%
Hyflux	31.7%
Siemens Memcor	7.5%
GE	6.0%
Inge	5.7%
*installed or under construction ≥ 2011	

Source: Global Water Intelligence 2013



# PRETREATMENT (SW)RO – TOWARDS INLINE

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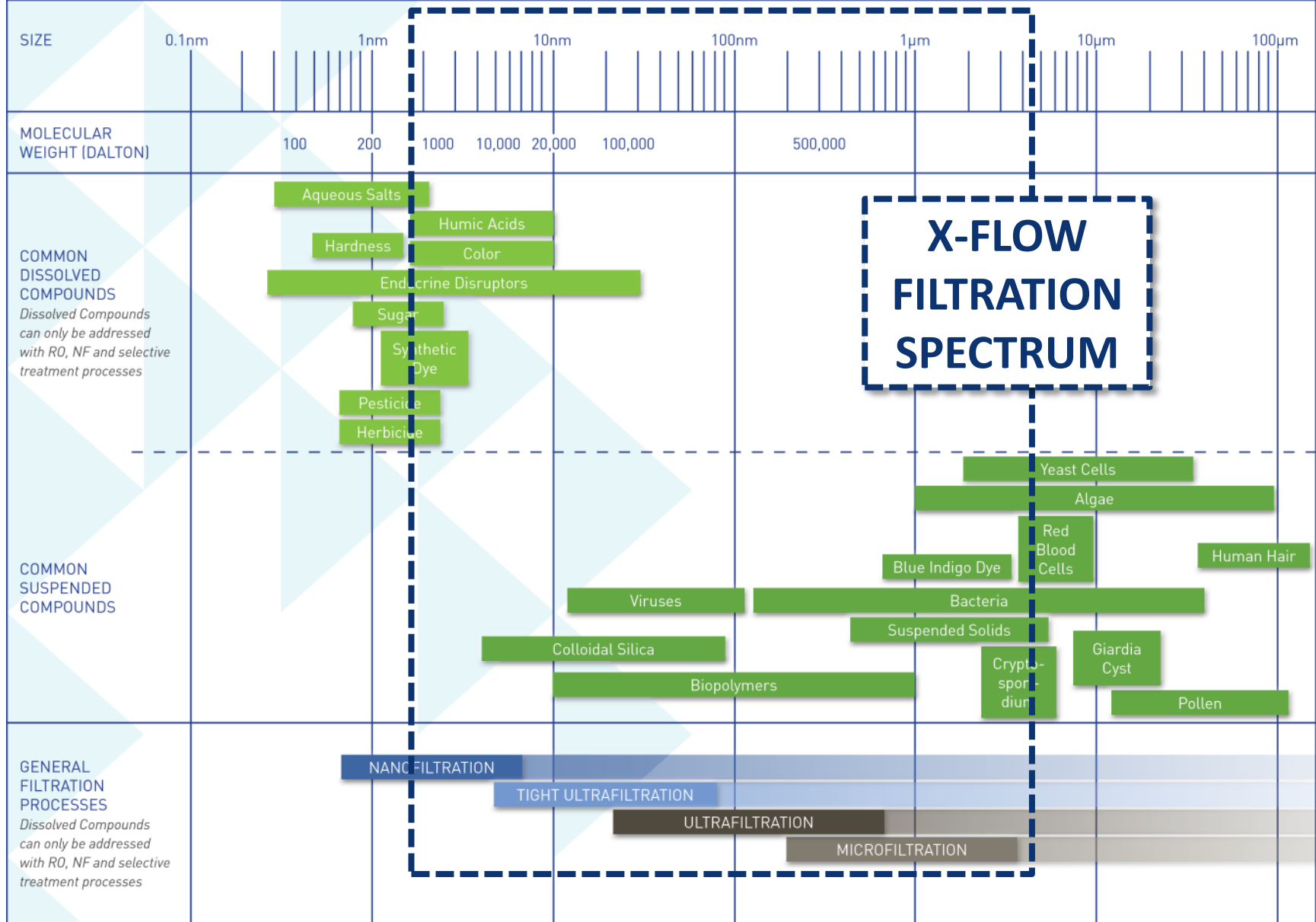
Most medium to large-scale UF (SW)RO projects awarded in the last 5 years are using X-Flow:

- Barka (Oman) 110 MLD inline
- Ashdod (Israël) 930 MLD inline
- Jubail II (Saudi Arabia) 240 MLD inline
- Jubail IV (Saudi Arabia) 350 MLD inline
- Candelaria (Chile) 66 MLD inline
- Nemmeli (India) 222 MLD
- Qingdao (China) 232 MLD
- Shuwaikh (Kuwait) 350 MLD inline
- Beckton (U.K.) 185 MLD inline
- Uramin (Namibia) 189 MLD
- Palm Jumeirah (U.A.E.) 192 MLD
- Sadarah (Saudi Arabia) 450 MLD inline



Note: according good engineering practice in all inline projects the UF membranes are installed in GRP membrane housings.





**X-FLOW TIMELINE**

2015

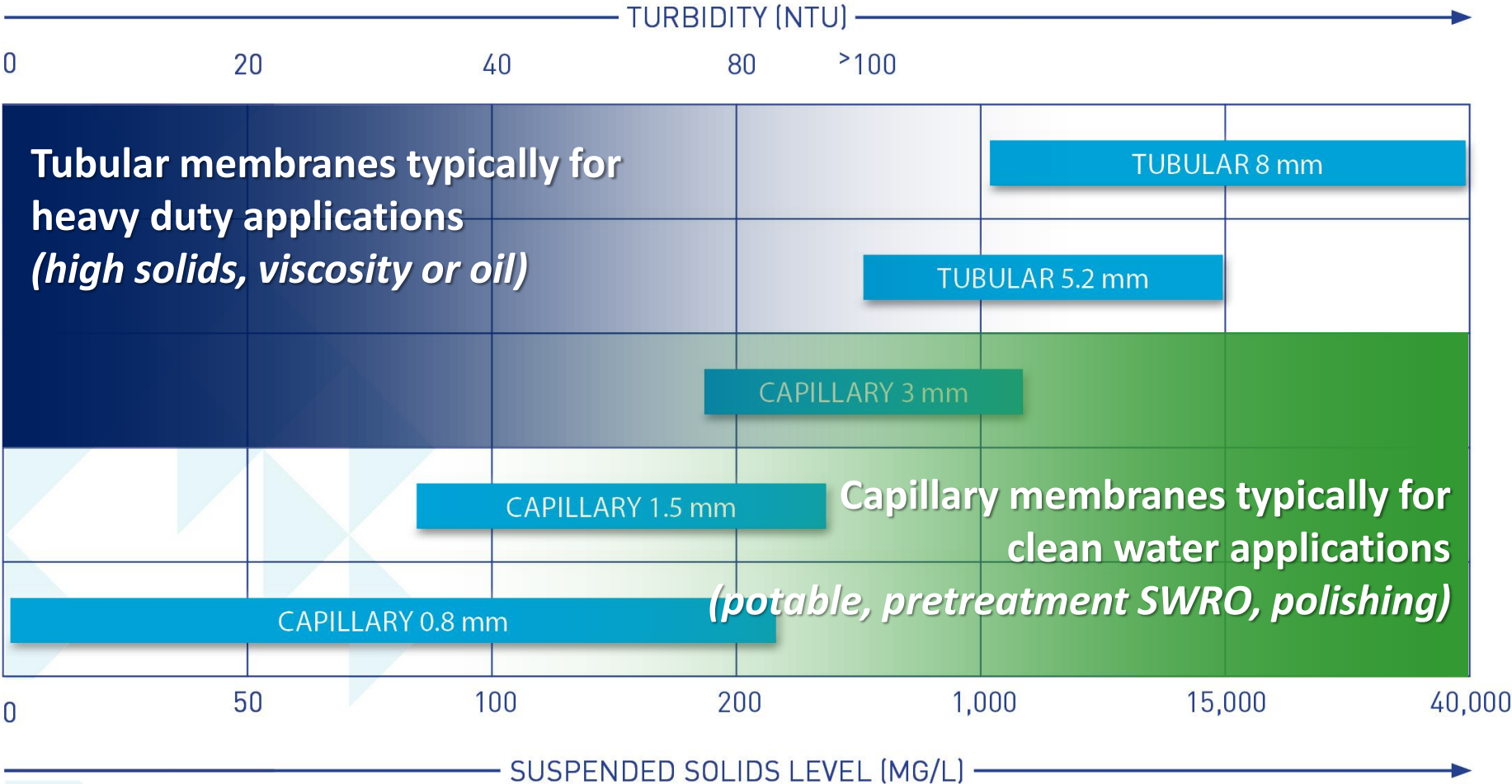
1984



# ULTRAFILTRATION



# X-FLOW ULTRAFILTRATION MEMBRANES

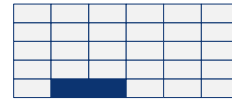


## Tubular and Capillary Membranes



# X-FLOW AQUAFLEX 64 - INTRODUCTION

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## VERTICAL DEAD-END ULTRAFILTRATION TECHNOLOGY

### TYPICAL APPLICATIONS:

- **Potable water** – Physical barrier for bacteria and viruses
- **Process water** – Direct use or pretreatment final step (e.g. RO)
- **Effluent polishing** – Direct reuse or pretreatment final step (e.g. RO)
  
- **Pretreatment desalination**

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## HOLLOW FIBER ULTRAFILTRATION





# X-FLOW AQUAFLEX 64 – VERTICAL DEAD-END UF



## MEMBRANES

- Hydrophilic membrane
- Material: PES/PVP
- Nominal pore size: 20nm
- Hydraulic membrane diameter: 0.83mm
- Recovery: 90-98%



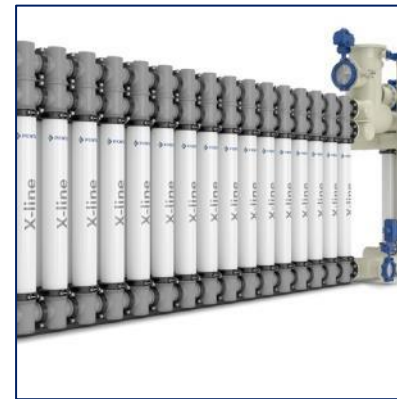
## MODULES

### AQUAFLEX 64:

- 64m<sup>2</sup> surface
- 8" x 1.5m
- 99.9999% Removal of bacteria (Log6)
- 99.99% Removal of viruses (Log4)
- Turbidity: < 0.1 NTU
- Silt Density Index: < 3

THE AQUAFLEX 64  
CAN BE APPLIED IN

X-LINE  
CONFIGURATION



PRE-ENGINEERED  
SOLUTION

SKID  
CONFIGURATION



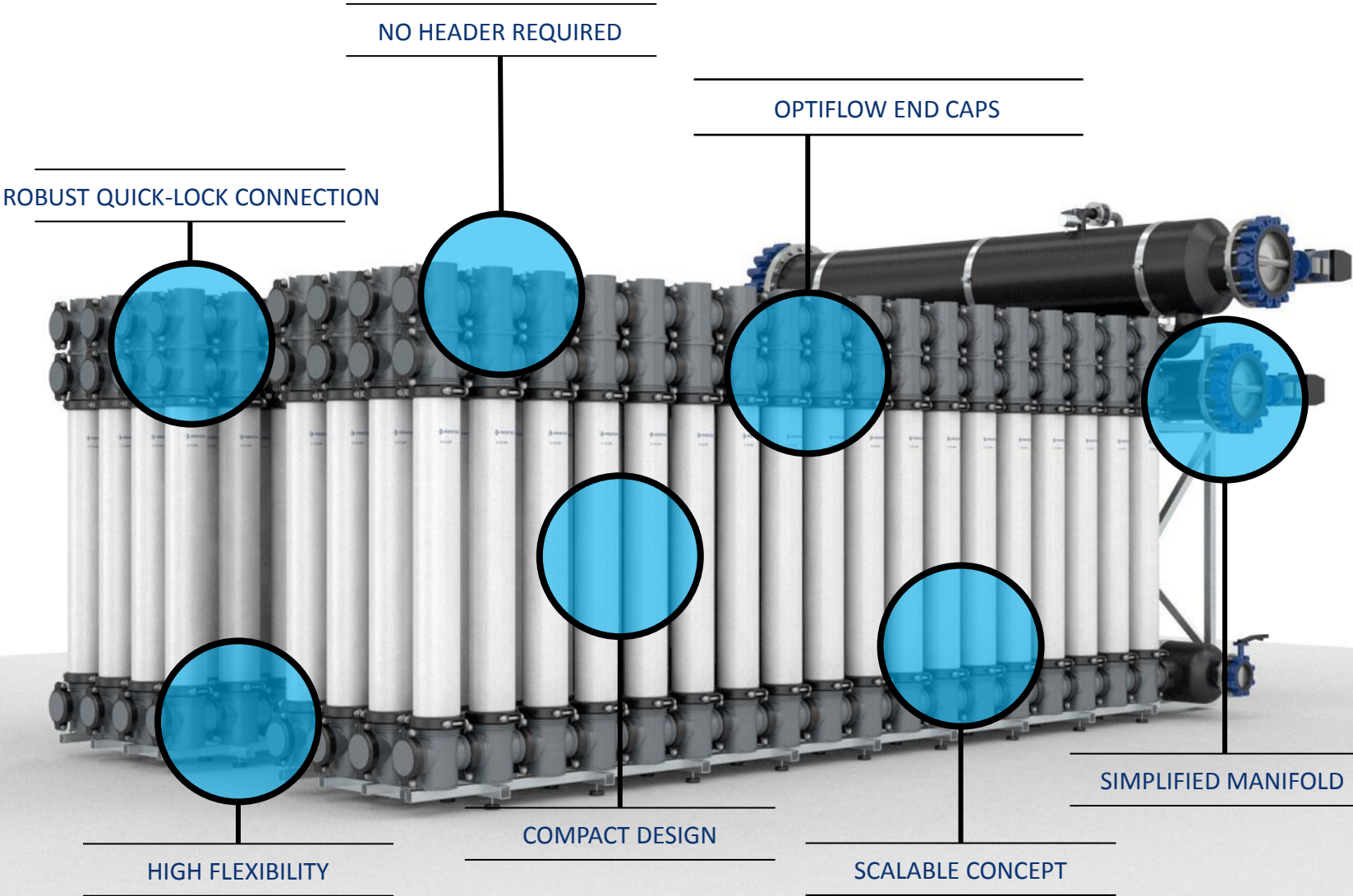
ENGINEERED  
SOLUTION

ALSO AVAILABLE:  
**AQUAFLEX 20**  
MEMBRANE DIAMETER OF  
1.5MM IN CASE OF HIGHER TSS /  
TURBIDITY

## HOLLOW FIBER ULTRAFILTRATION



# X-LINE RACK

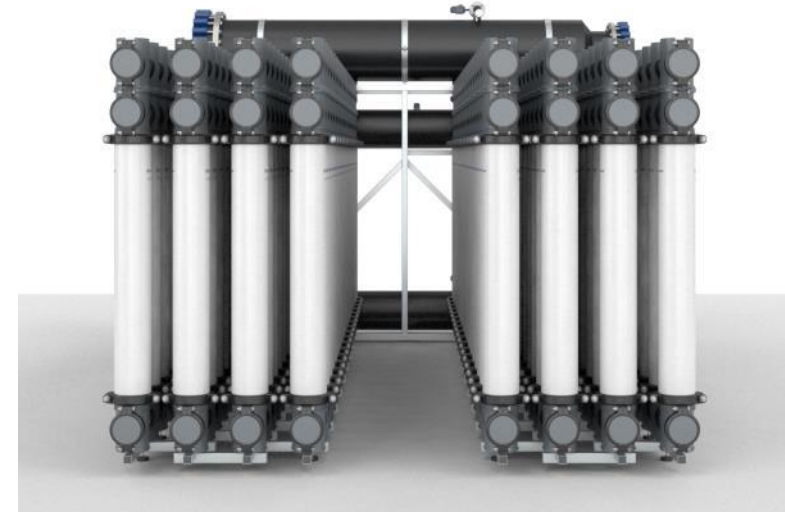


## PRE-ENGINEERED VERTICAL DEAD-END UF

# X-LINE RACK MANIFOLD

A MANIFOLD DESIGNED FOR:

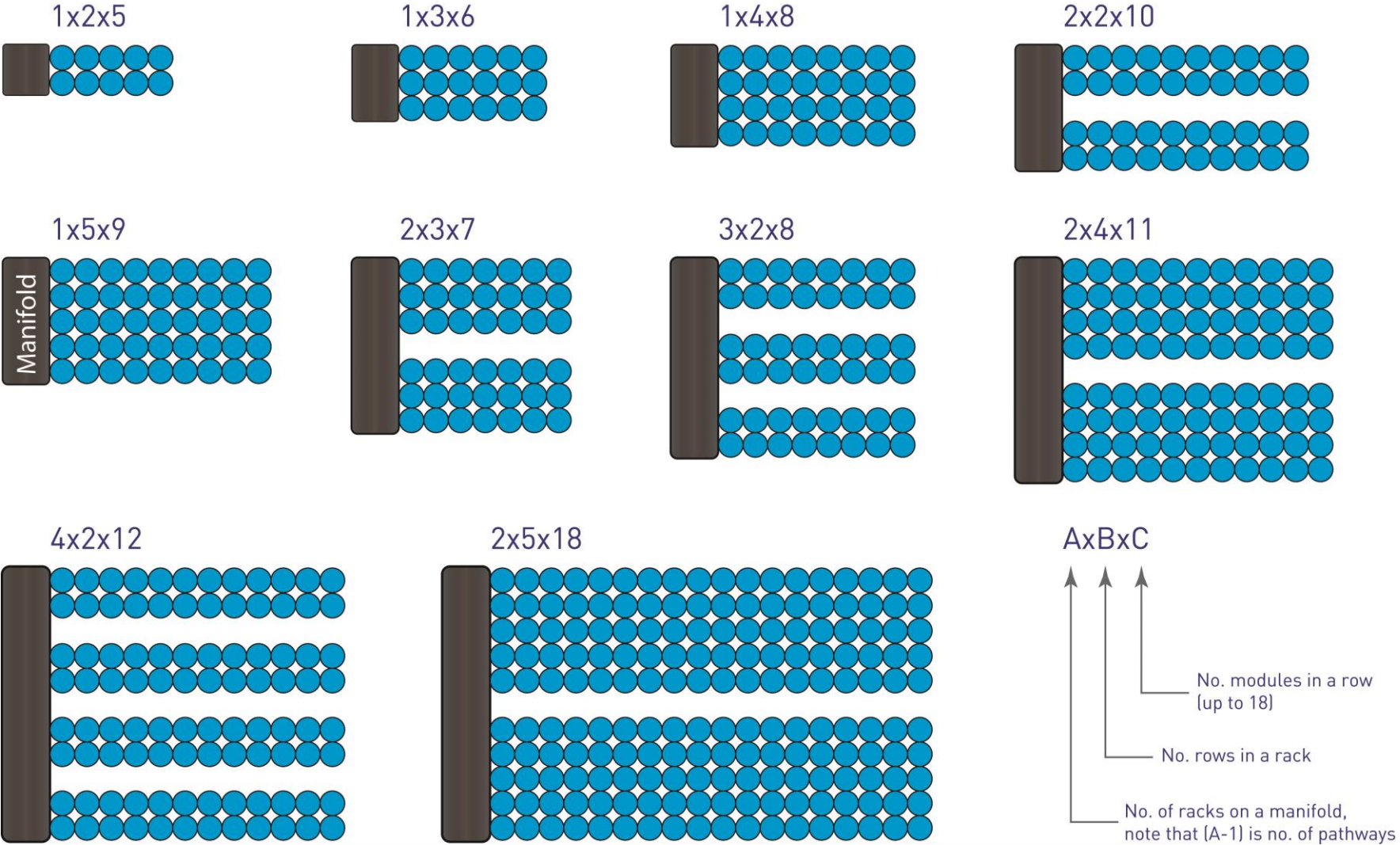
- Simplicity
- Small footprint
- Flexibility
- Accessibility



OPTION: PATHWAYS FOR  
INCREASED ACCESSIBILITY



# X-LINE CONFIGURATIONS: MANIFOLD AND RACK



# AQUAFLEX REFERENCES

## SKID CONFIGURATION



POTABLE WATER TREATMENT  
WTE Wassertechnik – Moscow (Russia)  
10,500 m<sup>3</sup>/h



POTABLE WATER TREATMENT  
Keokuk Water Works – USA  
1,500 m<sup>3</sup>/h

## X-LINE CONFIGURATION



PROCESS WATER TREATMENT  
TKI – Ankara (Turkey)  
70 m<sup>3</sup>/h

# HOLLOW FIBER ULTRAFILTRATION



QUESTIONS?