



BY



PENTAIR

FLUX ENHANCEMENT TECHNOLOGY ULTRAFILTRATION WITH A TWIST

Membranes for water treatment and reuse

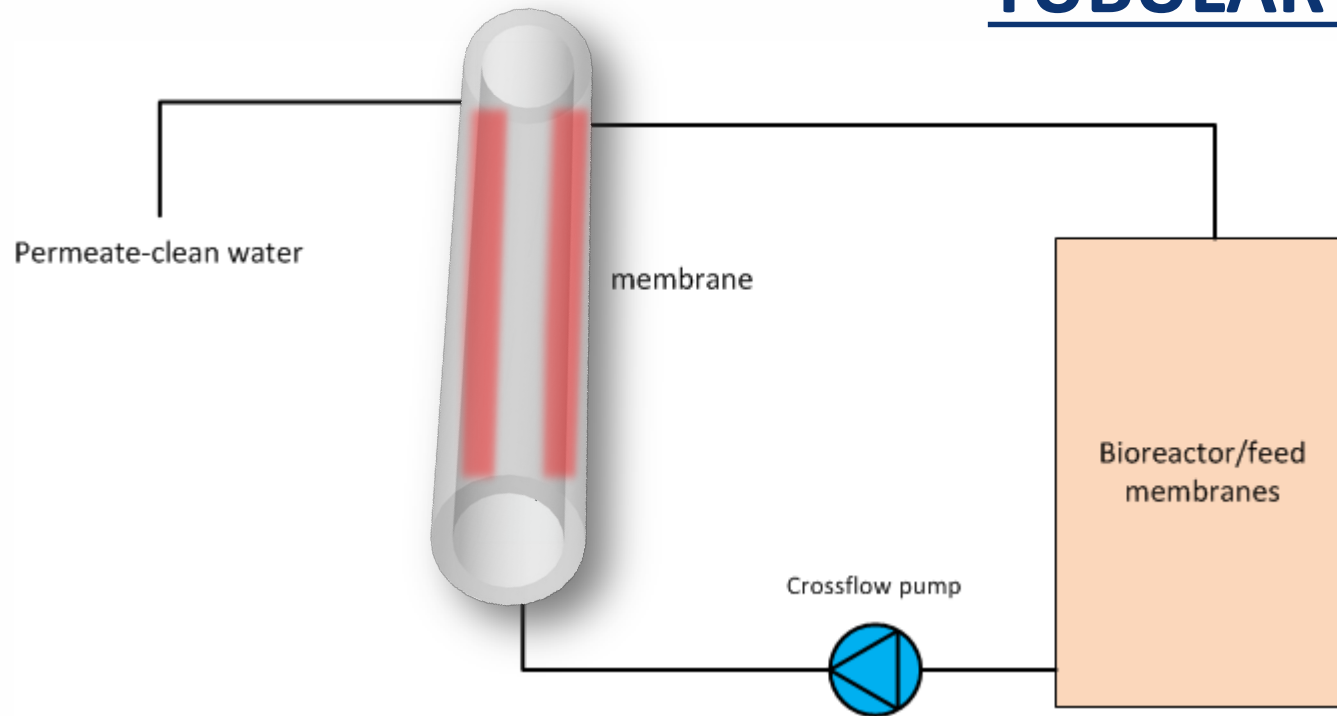
WORKSHOP

THURSDAY 15th of JUNE 2017

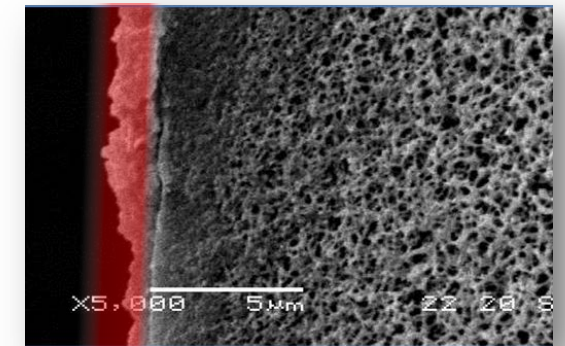
Parc Científic i Tecnològic de la UdG - GIRONA



TUBULAR MEMBRANES: PROCESS



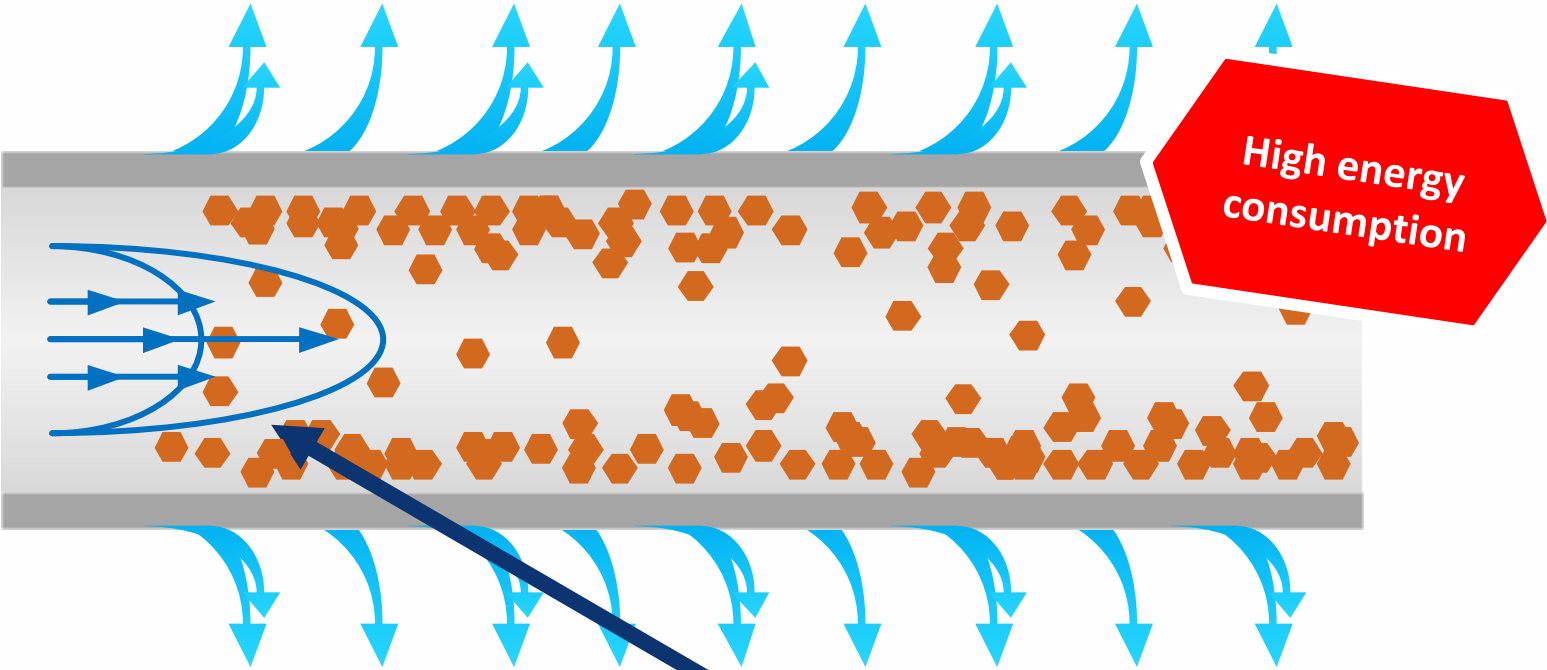
- High solid concentration
- High circulation flows
- Low filterability of the feedwater



Cake layer build-up



CONVENTIONAL APPROACH



The conventional solution:

Apply higher crossflow velocity

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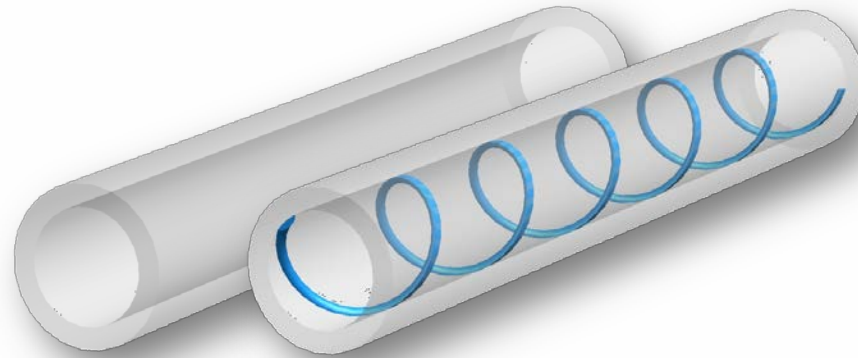




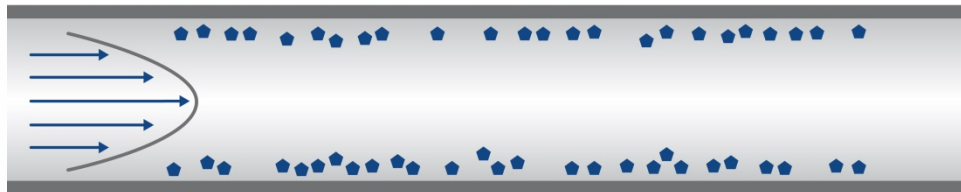
Flux enhancement via:

1. Helically wound ridge on membrane wall
2. Turbulence right at the membrane wall
3. Enhanced mixing of the feed stream
4. Efficient continuous cake removal

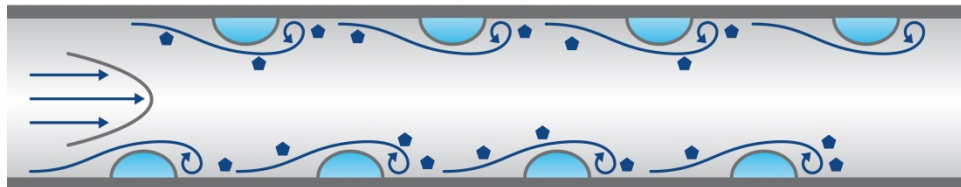
At lower crossflow velocity



Flow distribution in standard tubular UF



Flow distribution in helix tubular UF



BENEFITS (depending on feedwater quality)

Higher productivity
up to 100% more permeate

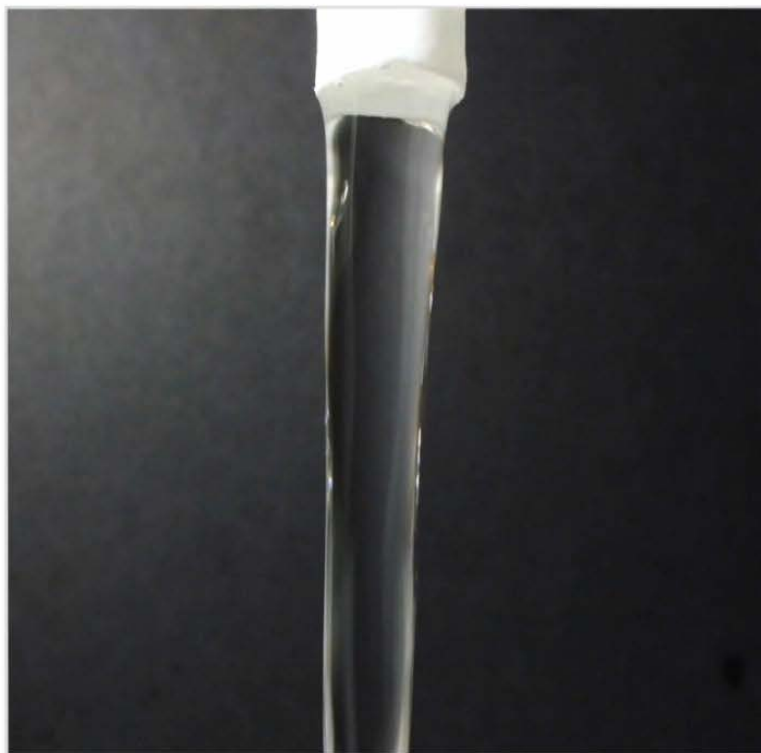
Lower operational expenses
up to 50% savings

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SEEING IS BELIEVING



STANDARD
TUBULAR MEMBRANE

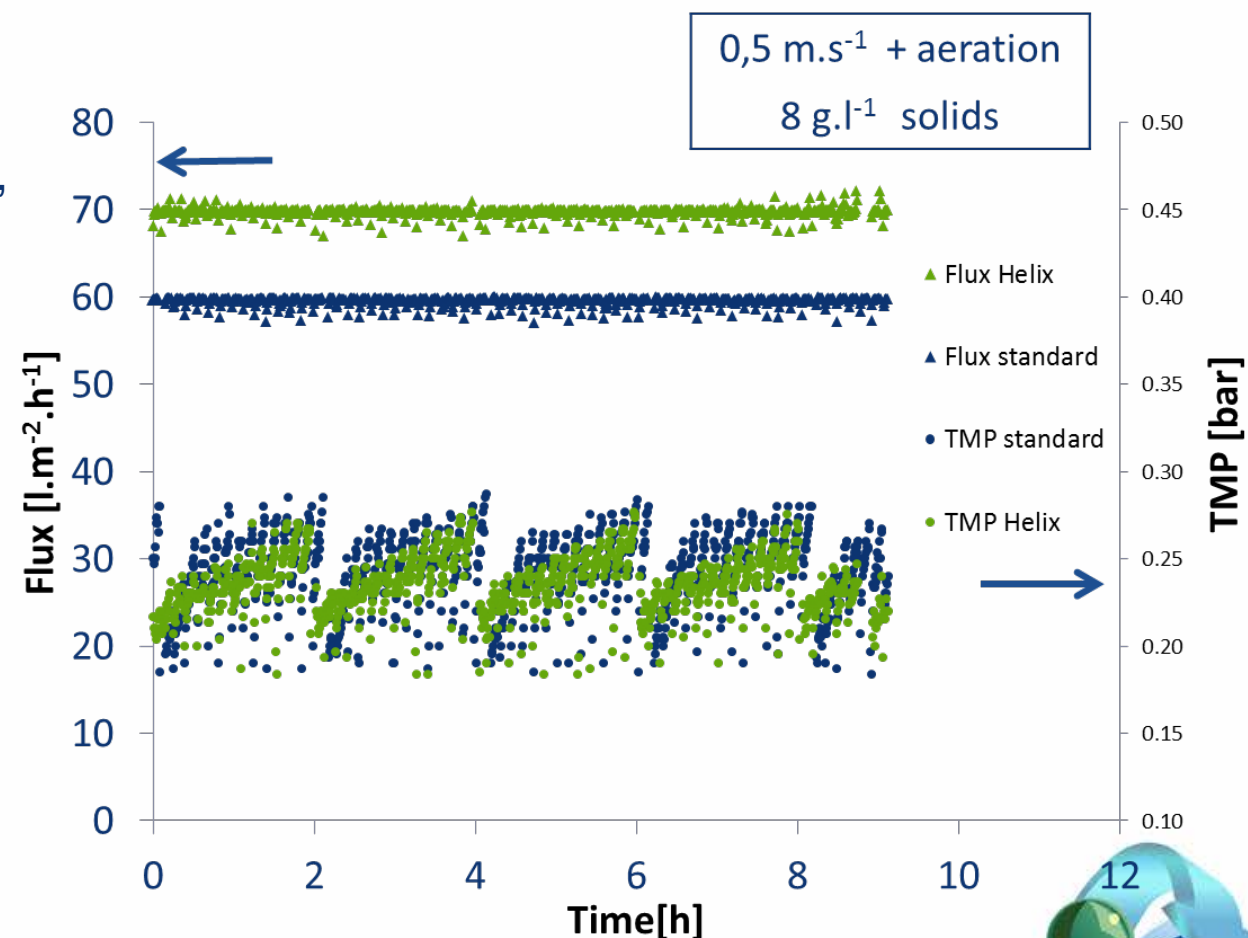


HELIX
TUBULAR MEMBRANE



CASE 1: FULL SCALE WWTP OOTMARSUM – AIRLIFT MBR

- Net-filtration capacity (flux) increase of 10-20%
- Although **high** turbulence is introduced by Airlift, the Helix provides an **extra reduction in energy consumption (5-15%)**



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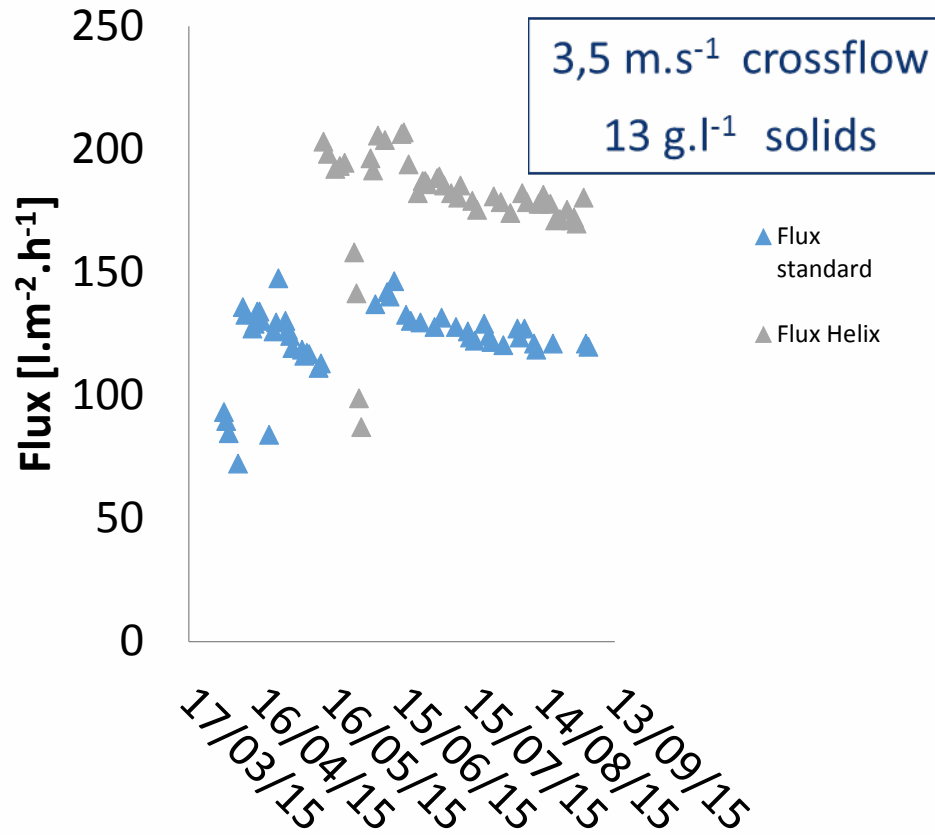


CASE 2: FULL SCALE MBR ANTWERP - LEACHATE

Membranas Standard



Membranas HELIX



- Two skids with different membranes (Standard and Helix) working alternatively
- Increase in the permeate flux of **30 - 50%**

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SUMMARY

Typical flux increase up until now:

- Airlift MBR 10-20%
- Crossflow (UF/MBR) 15-50%
- Anaerobic MBR 50-100%

Flux increase is highly application dependent



Date	Location	Configuration	Performance	Application
Nov, 2013	Netherlands	Anaerobic MBR	100% higher flux	Beverage WWT
Mar, 2014	Netherlands	Airlift MBR	10-20% higher flux	Municipal WWTP
May, 2014	Norway	Crossflow UF	No performance increase	Seawater pretreatment
Jul, 2014	South Africa	Anaerobic MBR	>50% higher flux	Dairy WWT
Jul, 2014	Germany	Crossflow UF	50% higher flux	Digestate
Sep, 2014	Russia	Crossflow UF	More stable performance	Produced water
Nov, 2014	Netherlands	Crossflow MBR	15% higher flux	Leachate
Nov, 2014	Netherlands	Airlift MBR	20% higher flux, more stable TMP	Municipal WWTP
May, 2015	Belgium	Crossflow MBR	40% higher flux	Leachate



THANK YOU

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