FLUX ENHANCEMENT TECHNOLOGY
ULTRAFILTRATION WITH A TWIST
**TUBULAR MEMBRANES: PROCESS**

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

**Cake layer build-up**
The conventional solution:
Apply higher crossflow velocity

High energy consumption
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

**BENEFITS** (depending on feedwater quality)

Higher productivity
**up to 100% more permeate**

Lower operational expenses
**up to 50% savings**
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%)
CASE 2: FULL SCALE MBR ANTWERP - LEACHATE

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

Flux [L.m⁻².h⁻¹]

3,5 m.s⁻¹ crossflow
13 g.l⁻¹ solids

Flux [L.m⁻².h⁻¹]

Membranas
Standard

Membranas
HELIX
## 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

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

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