Reducing Chemicals and Waste with Advanced Water Purification Technology

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Dow Water & Process Solutions
Going “Green”

- Less chemicals
- Less waste

- UF
- EDI
Make-up Demin Overview

Raw Water → Storage Tank → Multi-Media Filter → UF → Softener → Storage Tank

Pre-treatment

Storage Tank → Anti-microbial → Anti-scalant

Roughing


IX (including packed bed)

Polishing

Product Water → Storage Tank → Mixed Bed Polisher → UV → Membrane Contactor / Degasifier → EDI

EDI → Membrane Contactor / Degasifier → UV → Mixed Bed Polisher
Ultrafiltration (UF) for Pre-treatment
Purpose of Pre-treatment

- Provide treated feed water to the RO System that allows for successful and cost-effective long-term operation
- Dampens variations in raw water quality (e.g., Turbidity)
- Minimize Scaling (chemical) and Fouling (biological) of the RO
- Extend RO membrane life
### Comparison: Dual Media Filter vs. UF

<table>
<thead>
<tr>
<th>DMF</th>
<th>UF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Widely used</td>
<td>Gaining acceptance</td>
</tr>
<tr>
<td>OK for RO feed</td>
<td>Very good for RO feed</td>
</tr>
<tr>
<td>Prefer 2-pass DMF</td>
<td>Footprint low</td>
</tr>
<tr>
<td>Floc/Coag/pH Chem</td>
<td>Low chemical dosage</td>
</tr>
<tr>
<td>Discharge sludge</td>
<td>Little sludge disposal</td>
</tr>
</tbody>
</table>
Better Water Quality to the RO System

Ref: CH2M HILL, 2009
US Membrane Capacity

Ref: Global Water Intelligence, SEDA Fall Symposium, Oct. 2009.

Cumulative Membrane Capacity, MGD

- BWRO
- SWRO
- MF/UF
- MS/NF
SWRO Pre-treat by UF

Electrodeionization (EDI) for Polishing
Make-up Demin Overview

Pre-treatment
- Multi-Media Filter
- Softener
- UF

Storage Tank

Raw Water

Roughing
- Single-Pass RO + Working Mixed Bed
- Double-Pass RO
- Single-Pass RO
- IX (including packed bed)

Anti-microbial
Anti-scalant

Polishing
- Mixed Bed Polisher
- UV
- EDI
- Membrane Contactor / Degasifier

Product Water

Storage Tank
EDI Advantages

• Eliminates the need for hazardous regeneration/neutralization chemicals
• Is a clean technology, the only consumable is electricity
• Is a continuous process, no need for offline regeneration
• Smaller footprint than conventional DI
• Situational cost advantages
EDI Construction

Plate and Frame
EDI Construction

Spiral Wound
Electrodeionization
DOW™ EDI System

EDI 100
Summary

• Safe, reliable, efficient, and **Green**

• UF
  - Only infrequent chemical usage vs. continuous coagulation/flocculation with MMF
  - Little sludge disposal vs. MMF

• EDI
  - Only uses electricity; no regeneration or neutralization chemicals required vs. IX MB