



	Conventional Evaporator	VS	Self-cleaning Evaporator
Operating Cost	High		Low
Scaling/Fouling in Tubes	Occurs		Does not occur
Power Consumption	High because heat transfer is not constant		Low
Recirculation Velocity	2-2.5 m/s		0.6-0.7 m/s
Water Evaporation Capacity	Average 60% on design capacity		100% on design capacity
CIP (Cleaning in Place)	Once a week		Not required
Pumping Power	More		Less

Conventional Evaporator



Self-cleaning Evaporator

<p>Plant Design</p>	<p>Oversized</p>	<p>Compact (constant heat transfer, no over-dimensioning is required)</p>
<p>Compatibility for High Hardness Effluent</p>	<p>Pre-treatment required</p>	<p>Compatible for high hardness effluent</p>
<p>Compatibility for High Suspended Solids</p>	<p>Pre-treatment required</p>	<p>Compatible for high TSS</p>
<p>Hazards Stream Generation after CIP/Jet Cleaning</p>	<p>Hazardous waste streams from cleaning must be recycled in ETP/MEE</p>	<p>There are no hazardous waste streams from cleaning</p>
<p>Product Concentration</p>	<p>Restrictions due to choking</p>	<p>High concentration can be achieved</p>
<p>Enhanced Productivity</p>	<p>Equipment need to be taken out of production for clearing</p>	<p>Equipment does not need to be taken out of production for cleaning (Inline-Continuous)</p>
<p>Energy Performance</p>	<p>Decreases as operation time increases</p>	<p>Better (tubes remain clean and the heat transfer is constant)</p>
<p>Hydro-jetting</p>	<p>Once every three months</p>	<p>Not required</p>
<p>Additional Cost for Cleaning</p>	<p>Costs include: chemical usage, anti-scalent usage, water consumption during cleaning, cost to treat water from cleaning, manpower, cost hiring waterjet, consumables like gasket</p>	<p>Not applicable</p>