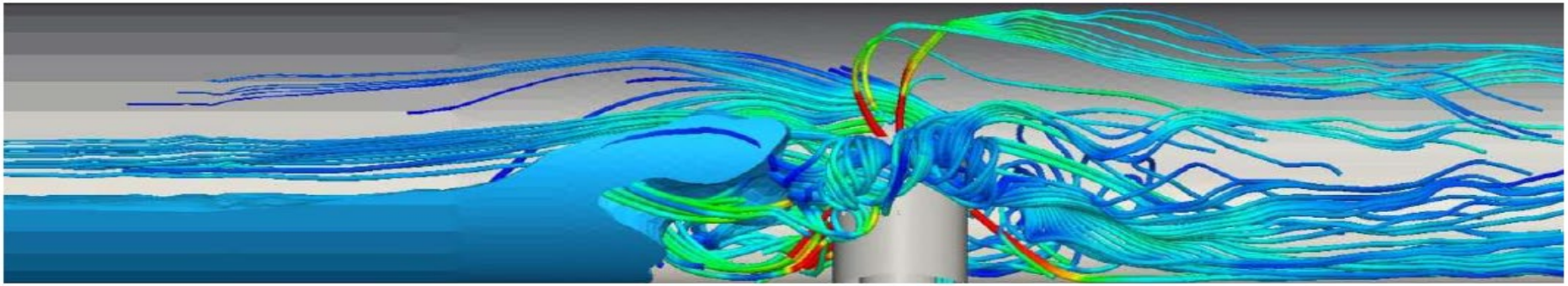
What is SmartMix® Technology?



- A sampling system that exceeds API 8.2 and ISO 3171
- A mixing system to improve control & reduce pressure drop
- A real-time measurement system to eliminate most lab testing
- A technology to predict and control liquid droplet size

What is SmartMix® Technology?

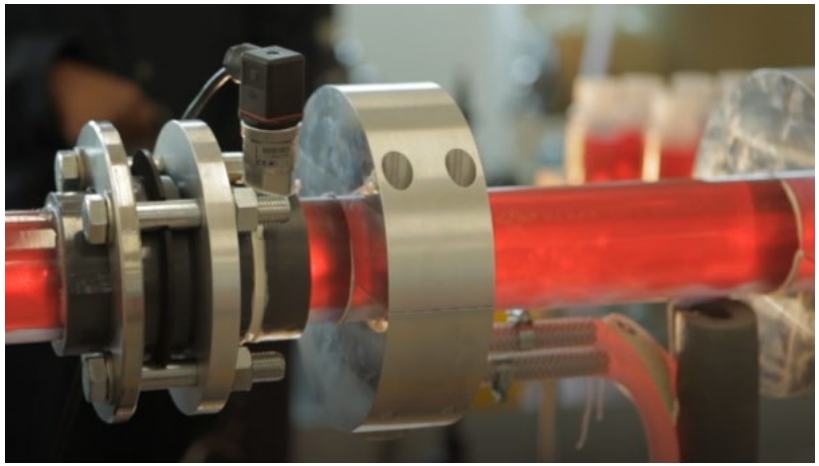
SmartMix® is a game-changing mixing and sampling technology for water-in-oil, oil-in-water, or other immiscible fluids.

It is a "fast-loop" mixing, sampling, and analysis system, based on computer-controlled strong-jet / weak-jet dynamic interaction, a technology that was initially developed for the aerospace industry (liquid-fuelled rockets and jet engines).

Extensive development was done in OGM's Flow Labs to create computer models of turbulent oil and water mixing.

OGM's small test loop is shown here:

SmartMix® Performance Video



To view a video recording of a real-time mixing demonstration of the SmartMix® mixing system,

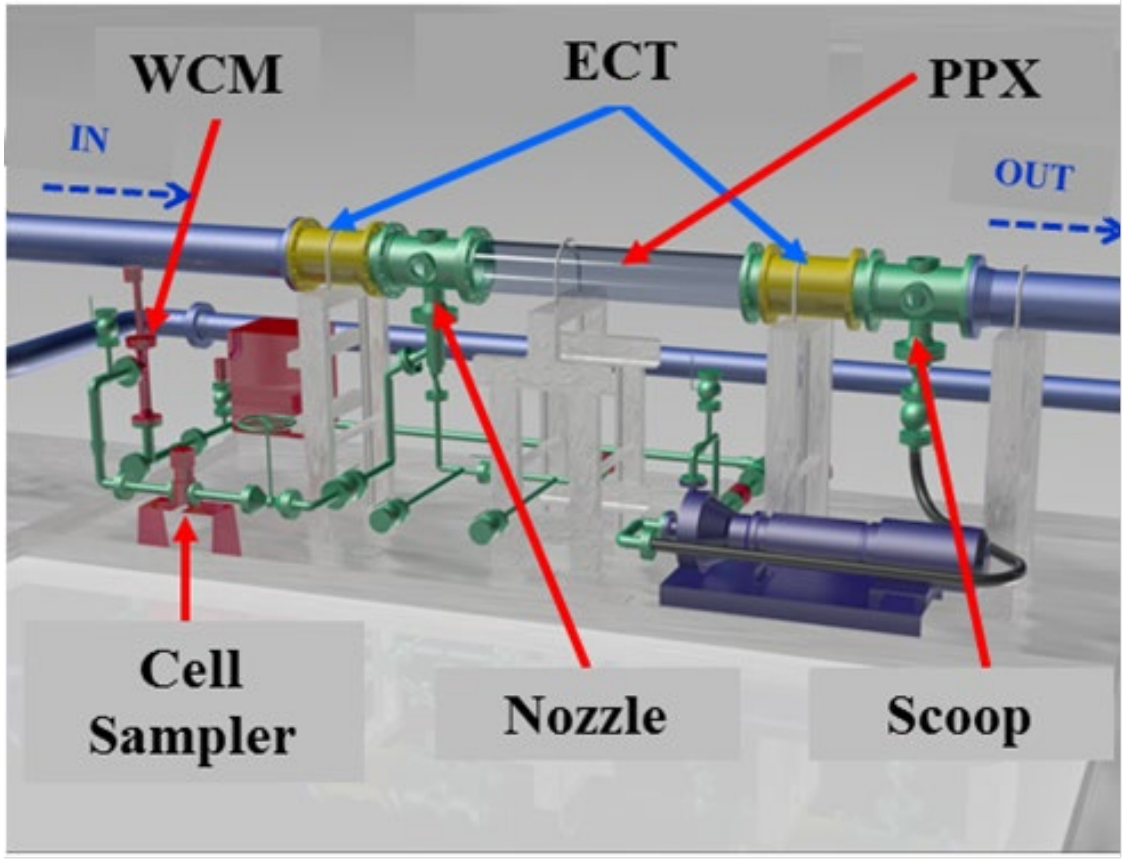
CLICK HERE

(Once open, click the “play” arrow to *start* the video and the “Esc” button on your keyboard to *exit* full-screen mode)

SmartMix® Water-in-Oil Sampling System

This diagram shows OGM's smaller flow testing loop that allows viewing of the flow.

The observed flow is compared to simulated performance to verify model accuracy.



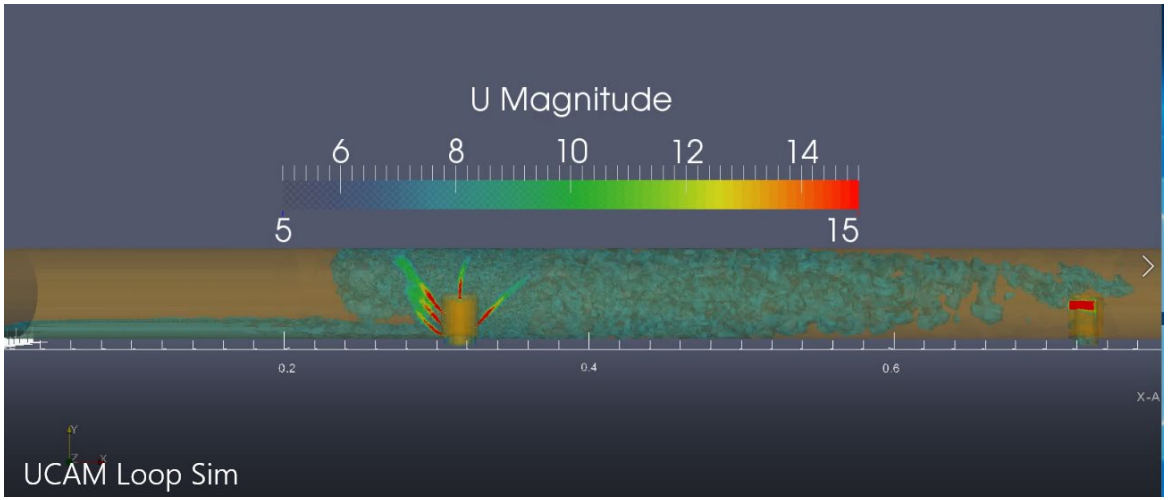
WCM - Water-Cut meters
ECT - Turbine Meter
PPX - Plexiglass Pipe

Calculated SmartMix® Performance

We prepare a high-resolution simulation of mixing performance over the client's full operating range of flow, viscosity and composition.

This model is used to determine optimum sample and re-injection locations.

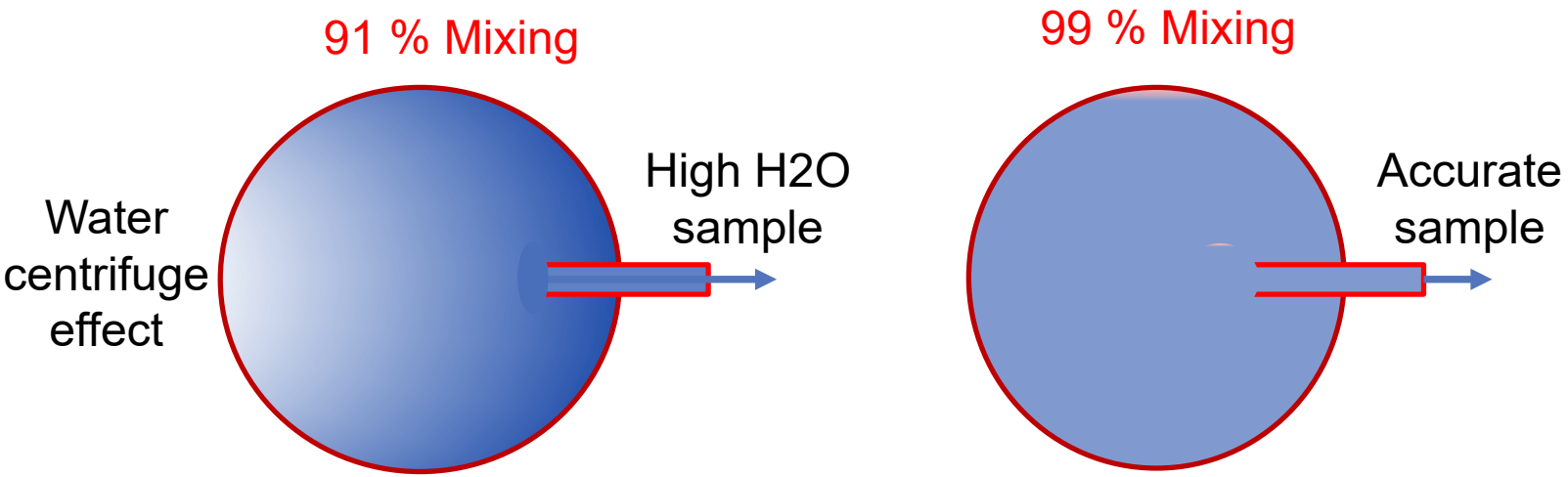
Optimum re-injection rate curves are developed for the whole operating range.



Click HERE to view the video of the simulated flow on ECI's training site

Why is SmartMix® a Better Solution ?

SmartMix® technology allows for better mixing over pipe cross-sections than API 8.2 and ISO 3171 standards. These mixing standards typically achieve only 91% (C1/C2) while SmartMix® may increase this to 97% or even 99%.

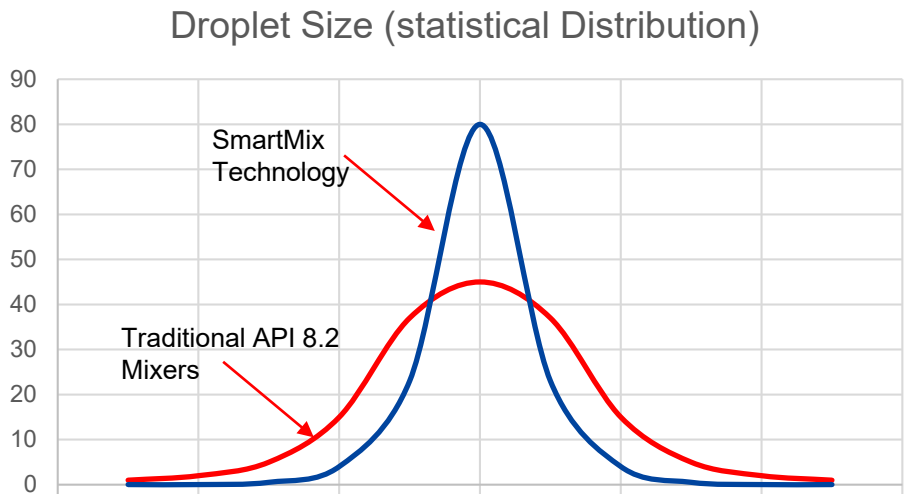


API 8.2 and ISO 3171 sampling systems may actually centrifuge the heavier water to the outside of the pipe, causing it to be over-estimated.

SmartMix® improves the accuracy of both lab samples and online analysis since the pipe cross-section is completely mixed. This improved accuracy can result in large savings in custody transfer applications.

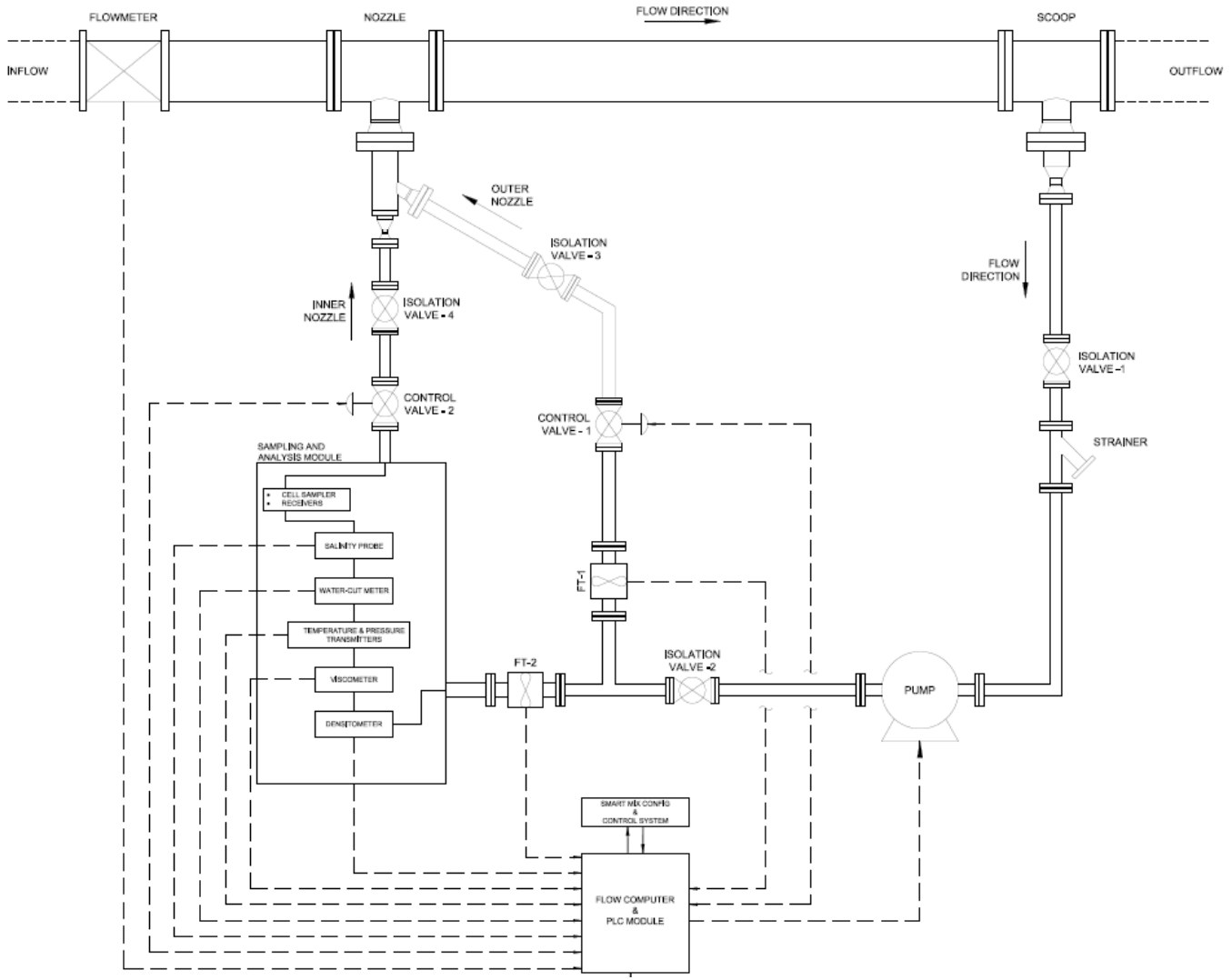
Droplet Control

SmartMix® can predict and control droplet size (both the mean and standard deviation) by controlling the speed and ratio of the mixing streams.



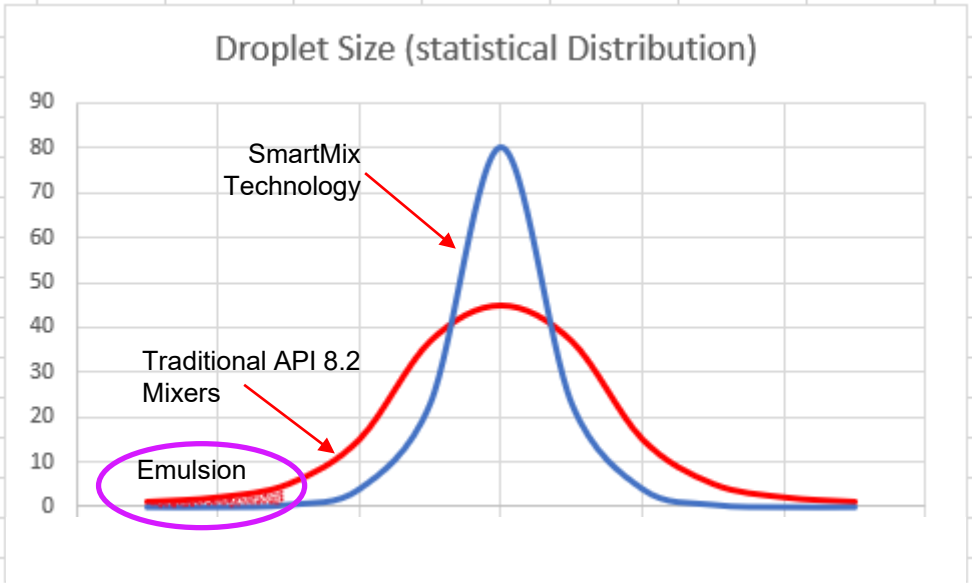
Patented SmartMix® technology measures fluid properties (density, viscosity, water salinity, temperature, etc.) and continuously adjusts its mixing jets to maintain the required droplet size and statistical distribution.

SmartMix® System Internals



Eliminate Crude/Water Emulsions

Because SmartMix® technology uses controlled liquid-jet interactions, high sheer forces that create oil/water emulsions may be avoided.

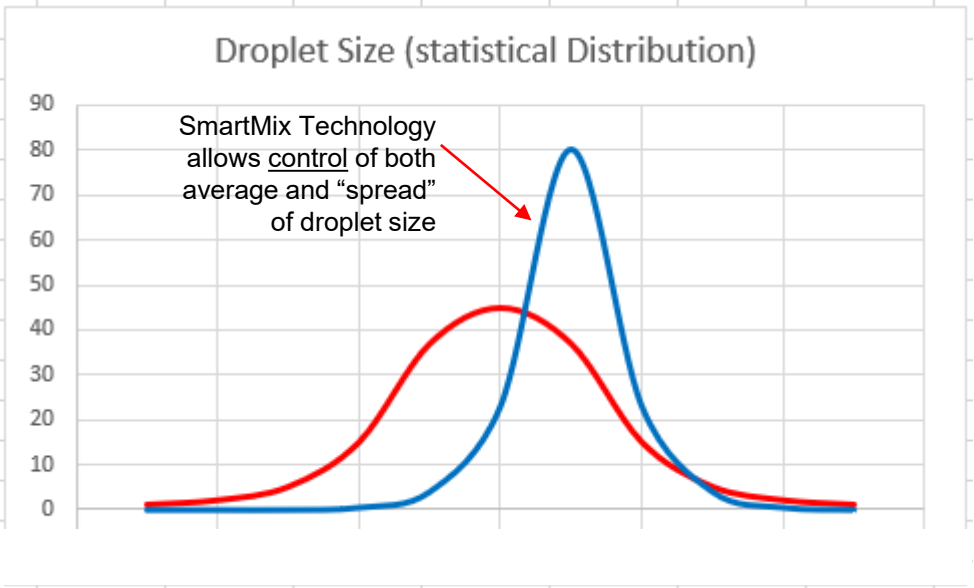


This reduces pressure drop and horsepower requirements compared to traditional mixing devices.

SmartMix® system is a “full flow” device with little if any obstruction of the flow.

Control of Average Droplet Size

SmartMix® technology also provides real-time control of average droplet size.



This can provide significant benefits for downstream equipment like desalters, or other liquid/liquid extraction units. It may even replace mixing valves completely, eliminating their pressure drop and maintenance.

Real-time Measurements

SmartMix® provides continuous real-time readout to Process Operators.

All analyzers are housed in the recycle loop and therefore will benefit from the homogenous (99% +) sample.

The standard SmartMix® analyser set includes:
Density (API), temperature, salinity, pH and % water.

Optional analyzers can be added including NIR (specific organics) Chromatograph (simulated TBP), or Optical droplet-size sensors.

SmartMix® continuous data provides engineering and purchasing groups with better records of exactly what was delivered.

Real-time Measurements & Lab Samples

SmartMix® technology includes a composite and/or grab sampler to capture more accurate samples for lab analysis.

Since the SmartMix® analyzers provide continuous readout, laboratory testing can be reduced.

Even if (optional) analyses are not included in SmartMix® (e.g. Bottoms Sediment, TBP, etc.,) users can benefit from improved lab samples.

SmartMix® data is available on Modbus or other standard communication links, so it can be combined with Laboratory and process data to provide better records.

SmartMix® – What does it Look Like ?

Available for Explosion Proof, Class 1 Division 2 environments

Example Process Applications

A SmartMix® system may be used to:

Monitor crude variations (in real-time) and detect water “slugs” that would not be seen by traditional API 8.2 sampling.

Optimize the operation of crude desalters chemicals use, water treatment & power costs.

Improve downstream operations such as

- Real-time Crude Unit Water balance
- Real-time API measurement (e.g. “dumb-bell crudes” ?)

Reduce process unit corrosion

- Real-time salinity monitoring (break-through detection)
- Match inhibitor addition to changine water and/or salt content

Control mixing and droplet size to optimize mass transfer operations such as Liquid/Liquid extraction.