

Electrostatic Treater Performance Enhancements

Efficiency-optimizing upgrades that improve crude oil processing

APPLICATIONS

- Upstream crude oil dehydration and desalting

ADVANTAGES

- Accommodates a wider range of inlet water content, providing higher treating capacities at lower operating temperatures, thus resulting in lower capex and opex
- Requires less washwater because of the improved mixing from electrophoretic movement of the water droplets inside the electrostatic field
- Includes composite electrodes that provides a higher treatment capacity for increased dehydration performance and promotes droplet coalescence with less voltage loss from arcing
- Improves vessel hydraulics, enhances performance, and enables reduced vessel size while providing the ability to vary the interface location over a wider range
- Improves emulsion resolution with the NATCO* LRC-II* smart interface, courtesy of the voltage modulation, and facilitates operating at the optimal voltage for multiple crude feedstocks while managing upsets more rapidly and effectively
- Provides heating and dehydration in a single vessel and eliminates the need for an externally heated heat transfer fluid when delivered as a heater treater

Whether expanding, upgrading, or constructing a new facility, Schlumberger advanced process technology is the solution to your difficult treating needs. Our commitment to both analytical and computational research and development in the field of crude oil dehydration—combined with a fundamental understanding of electrostatic treating physics—results in three significant, proven process technologies to further enhance treater performance. A number of enhancement components are available to heighten the treater's efficiency.

Composite electrodes

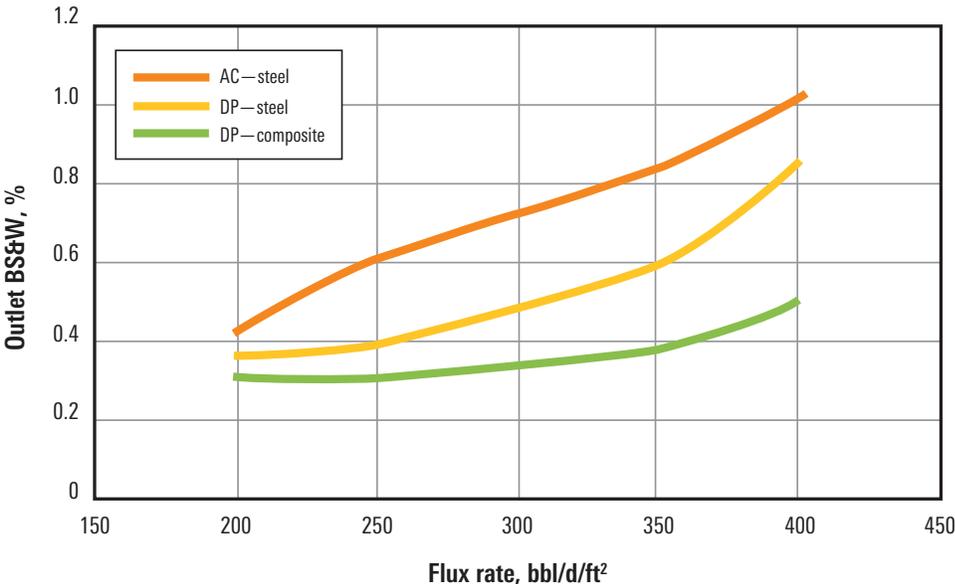
Extremely wet or highly conductive crude emulsions may cause arcing that instantly discharges an entire steel electrode array, thus stopping dehydration. Constructed of a fiberglass and graphite material, our patented composite electrodes resist electrical flow across their surface area. When an arc strikes, only a small area of the electrode is discharged, thereby eliminating sustained arcing and keeping the dehydration process on line.

Documented results include

- throughput gains of 25%
- improved tolerance to the interface rag
- minimized slippage of untreated crude through the electrostatic field.

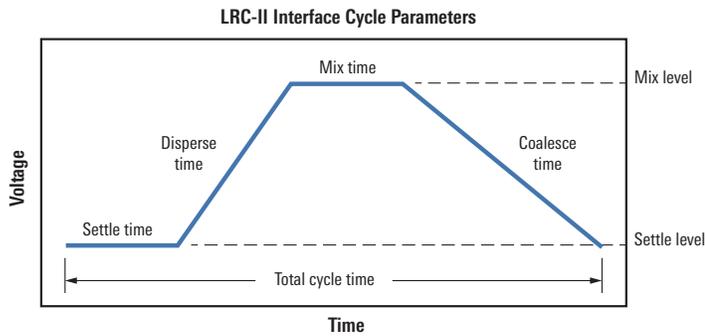
Performance Comparison

32-API oil, 8.8%–10.5% inlet BS&W, 125 degF
AC vs. NATCO DUAL POLARITY treater — steel vs. composite electrodes



Optimizing the treater with composite electrodes results in significantly decreased basic sediment and water (BS&W) percentages at a range of flow rates.

Electrostatic Treater Performance Enhancements



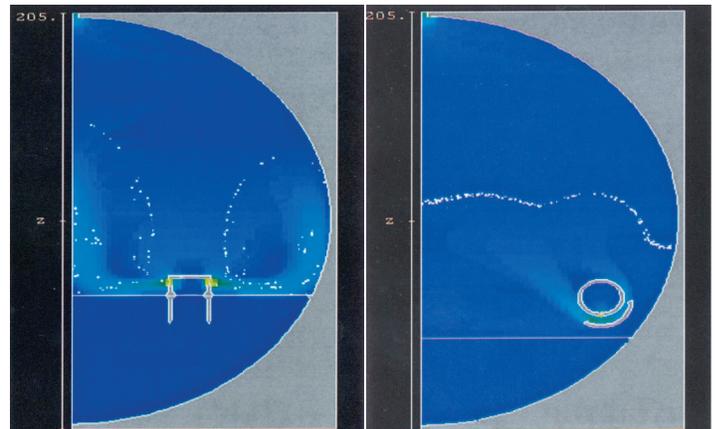
By self regulating the flow of electrical current, the LRC-II smart interface provides full voltage regulation independent of process conditions.

LRC-II smart interface integration

Electrostatic fields work best if optimized for each crude. However, when feed properties change, conventional power units compensate for an increased power demand by lowering the output voltage, which reduces operating performance. The LRC-II smart interface was developed to self regulate the flow of electrical current by providing full power voltage regulation—even during process upset conditions.

The results include

- higher tolerance for conductive crude
- rapid return to normal operations after process upset conditions
- computerized monitoring to prevent process upsets
- remote monitoring and tuning capabilities of power supply properties.



The computational fluid dynamics (CFD) summary on the left shows scattered and turbulent distribution while the summary on the right shows minimal turbulence with equal distribution in the vertical plane.

Advanced patented flow distribution

Good flow distribution is critical to any separation vessel. Through the use of CFD, the shrouded inlet spreader was patented. The shroud functions as a momentum absorber that reduces the fluid velocity prior to release into the inlet emulsion into the electrode area. Performance improvements include

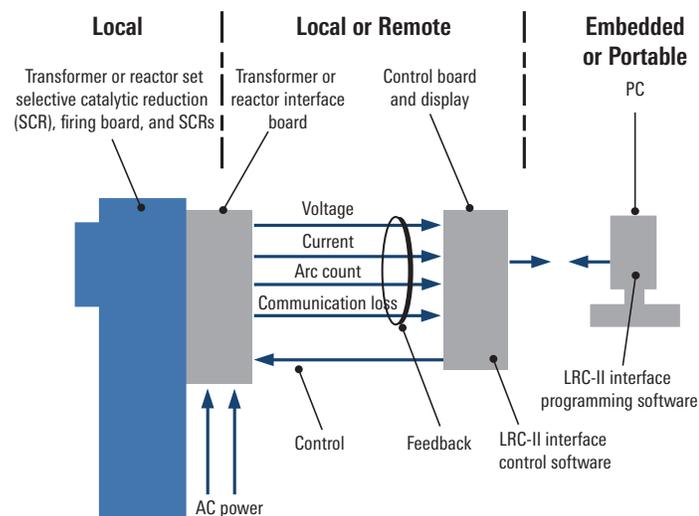
- elimination of parasitic circulations within the vessel
- vessel hydraulic efficiency that approaches 100%
- elimination of fluid bypassing the grid sections.

Performance

Thousands of installations in oil fields across the world provide the foundation for our crude oil dehydration experience. World-class results have been achieved onshore and offshore, on fixed and floating platforms, in North and South America, Europe, Asia, and Africa. Oils with low API, laden with solids, with high conductivity, loaded with paraffins—all have been successfully dehydrated by Schlumberger systems.

If process requirements are more vigorous, Schlumberger resources can help to evaluate your production capabilities. In-house fabrication capability and expert engineering staff enables the delivery of consistent high quality, timely delivery, and superior expertise to assure that completed projects meet customer expectations.

LRC-II Interface Hardware Configuration



slb.com/oil-treatment

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