

## NATCO DUAL FREQUENCY

### Electrostatic treater

#### APPLICATIONS

- Crude oil dehydration and desalting

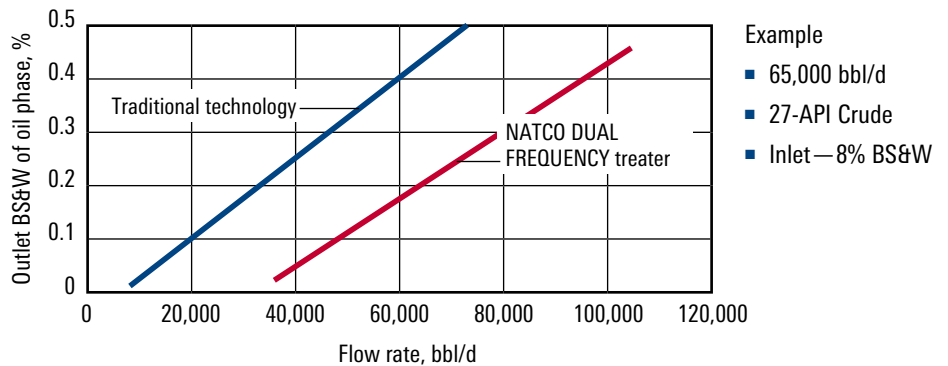
#### ADVANTAGES

- Handles a wider range of inlet water content
- Provides higher treating capacity
- Allows lower operating temperatures
- Enables improved vessel hydraulics and reduction in vessel size
- Facilitates better treatment of high-conductivity crudes
- Improves water droplet coalescence
- Reduces chemical use
- Minimizes power consumption with near-zero reactance
- Outperforms older, conventional AC technologies
- Easily upgrades from NATCO DUAL POLARITY\* electrostatic treater
- Performs AC and DC coalescence in two separate stages

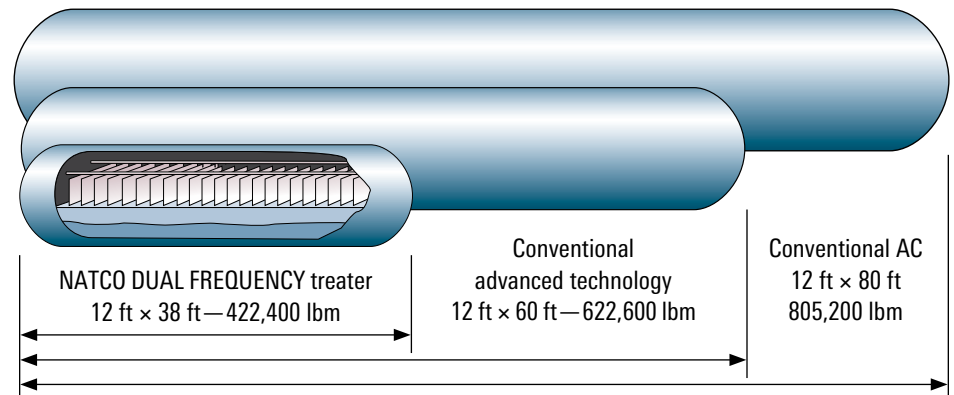
The patented NATCO DUAL FREQUENCY\* electrostatic treater uses a proprietary process controller, NATCO\* LRC-II\* smart interface, and three-phase power unit to produce a customized electrostatic field that can be readily optimized for any crude oil. The technology provides a nearly 100% process improvement compared with conventional electrostatic technology.

Since 1971, the NATCO DUAL POLARITY electrostatic treater has been used to dehydrate and desalt the world's crude oil. The patented NATCO DUAL FREQUENCY treater continues our legacy of leadership in electrostatic technology.

Three primary components are packaged in a single oil-filled enclosure. First is the power electronics, designed to produce a variable amplitude and variable frequency voltage field. For many field installations, this is a key feature of the technology, as it enables an optimization of the applied voltage. Second, the medium-frequency power unit provides for the increased secondary voltage known to promote effective coalescence. Third, the secondary voltage is rectified to produce electrophoretic movements of the water droplets, which improves both dehydration and desalting.

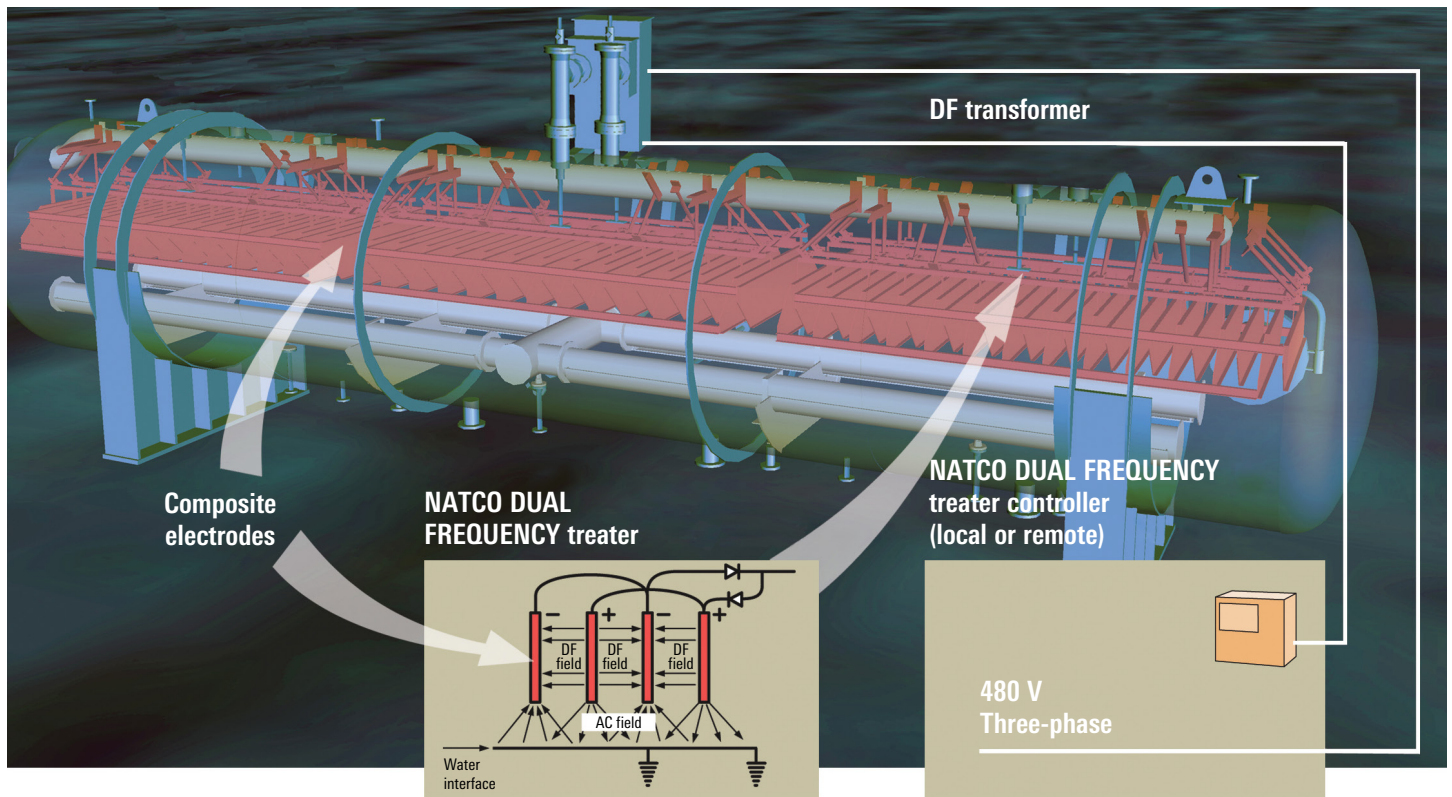


NATCO DUAL FREQUENCY treater results.



Possible vessel size reduction with high-tech internals.

# NATCO DUAL FREQUENCY



*NATCO DUAL FREQUENCY electrostatic treater cross-section.*

A DC field is created between the electrodes, enabling droplet motion and efficient coalescence. Simultaneously, an AC field is created between the electrodes and the grounded water phase, enabling bulk water removal in the weaker AC field.

Traditional AC technologies typically experience rapid voltage decay or arcing when operated in very wet crude oil service. This decay reduces the effectiveness of the dehydration process by reducing the voltage lower than what is required for effective dehydration.

By applying a higher-frequency electrostatic field, the treater reduces this voltage decay and enables effective dehydration, thus overcoming the voltage decay experienced with conventional 50/60-Hz transformers.

The specific oil and water properties, operating temperature, and formation solids all combine to create a unique emulsion that often can be very difficult to resolve. To break the emulsion, the patented NATCO DUAL FREQUENCY treater uses a microprocessor-based system that includes the LRC-II smart interface and defines the pattern and amplitude of the voltages that are applied to the electrodes. The proprietary LRC-II smart interface enables selection of the shape and amplitude of the voltage waveform to optimize coalescence of the water droplets, leading to an effective resolution of the emulsion and low water content in the treated crude.

[slb.com/oil-treatment](http://slb.com/oil-treatment)