

# NATCO DUAL POLARITY

## Electrostatic treater

### APPLICATIONS

- Dehydrating and desalting crude oil produced in upstream fields
- Desalting crude slates as the first step in refining

### ADVANTAGES

- AC/DC design increases throughput and operating range
- Patented treater components increase operating efficiency
- Lower processing temperatures decrease operational fuel costs
- Dual polarity accelerates water droplet coalescence, advancing oil-water separation
- Vertically configured electrodes extend voltage fields and resist solids loading
- Composite electrodes combat arcing to reduce voltage loss and promote droplet coalescence
- High-flow distributor eliminates flow channeling within the vessel
- Entrance bushings are CE marked and ABSA certified

The NATCO DUAL POLARITY\* electrostatic treater employs AC and DC fields and incorporates a power unit that has become an industry standard for reliability.

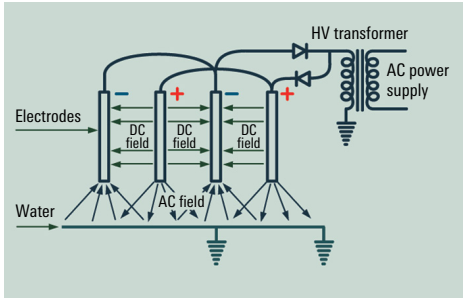
The treater’s dual-polarity design enables it to split the voltage with rectifiers into positive and negative components. Pairs of vertical electrodes are charged in opposition. The oil-water emulsion from the distributor enters the DC field between electrodes, and the water droplets will accept the polarity of the closest electrode. Once the emulsified water droplets approach an electrode plate, they accept the charge of that plate. The water droplets are moved by electrophoretic force toward the electrode of opposite polarity, causing head-on collisions and coalescence. When the droplets are large enough, gravity will overcome the DC field, and the droplets will separate by gravity into the water phase.

### Increased throughput rates

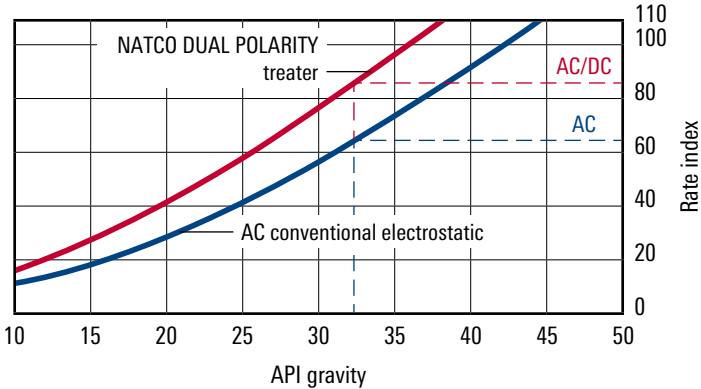
The NATCO DUAL POLARITY treater's capability to increase coalescence enables it to handle higher flow rates while employing a smaller vessel versus conventional treaters. When compared with a conventional electrostatic treater, the NATCO DUAL POLARITY treater demonstrated a throughput increase of 29% when processing a 32.5-API crude. The treater’s smaller footprint makes it ideally suited for offshore production platforms and housed arctic operations, while capable of handling large throughput.



Typical NATCO DUAL POLARITY electrostatic treater.



Electrostatic fields.



Increased flow rates.

# NATCO DUAL POLARITY

## Composite electrodes

Because extremely wet or highly conductive crude emulsions are prone to cause arcing, treaters with steel electrodes can suffer instant discharges across an entire grid, decreasing dehydration efficiency. The NATCO DUAL POLARITY treater's patented composite electrodes are made of fiberglass with a near-graphite middle strip, which resist electrical flow across the electrode surface. When an arc strikes, only a small area of the electrode is discharged, eliminating sustained arcing and minimizing dehydration process interruptions.

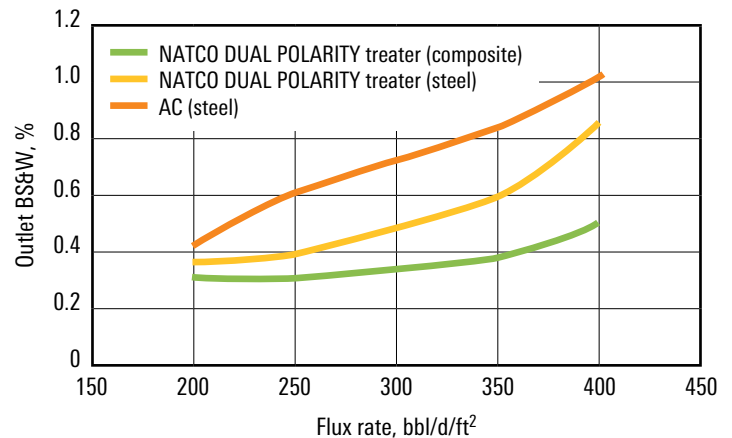
## Patented design ensures fluid distribution efficiency

The treater features a patented high-flow spreader, which functions as a momentum absorber that reduces the oil-water emulsion velocity prior to release into the treater. This eliminates parasitic circulations within the treater and prevents emulsion flow channeling and grid section bypassing.

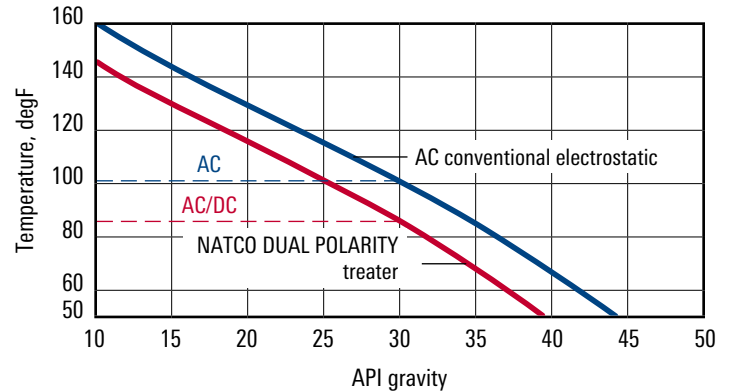
## Lower opex and capex

Compared with conventional electrostatic treaters and mechanical heat treaters, the NATCO DUAL POLARITY treater can operate at temperatures that are 15 degF [-9 degC] and 60 degF [16 degC] cooler respectively. For example, when compared with a conventional electrostatic treater, processing 10,000 bbl/d of 30-API gravity crude and 1,000 bbl/d of water, the NATCO DUAL POLARITY treater's reduced operating temperature would save 1,156,250 Btu/h.

For processing facilities that want to upgrade other manufacturers' crude oil treating equipment, the NATCO DUAL POLARITY treater's comprehensive design also enables it to be adopted as a time- and opex-saving retrofit solution.



Performance comparisons of NATCO DUAL POLARITY treater and AC as well as steel and composite electrodes for 32-API oil, 8.8–10.5% inlet BS&W, and 125 degF.



Reduced operating temperature.

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