



ECO-Friendly Oil Treating

“Electreater™ - Where Engineering Meets Ingenuity”

PREFACE

Our new all-electric patent pending “heater treater” completely eliminates all green-house gases. Conventional heater treaters use low efficiency natural gas fired burners inside firetubes to generate the heat needed to treat crude oil to pipeline specifications. Gas fired heater treaters transfer only 10-20% of the heat generated in the firetube into the crude oil stream. That means 80-90% of all heat is lost up the stack. Our revolutionary new “Electreater™” uses staged electric immersion heaters instead. The new Electreater™ is 100% thermally efficient, incrementally staging 100% of the heat generated into the crude oil stream. The result is significantly more reliable oil treating, lower treating costs and a 100% reduction in green-house gas emissions.

KEY COMPONENTS AND FEATURES

The new Electreater™ is a horizontal, heated, three-phase separator designed to first gently separate gases from liquids, and then to efficiently separate water from oil. The goal is to dehydrate the inlet crude oil to the 0.5% BS&W pipeline specification. Doing so ensures that all crude oil buyers will purchase the crude without any pricing penalties.

The first key component is the inlet fluid distribution system. This is a momentum absorber, a liquids-gas separation device, and a uniform liquids distributor. Its design is based on Shell’s Schoepentoeter inlet distributor, a proven and popular design patented in the 1920s. In this case the device divides the liquids flow into multiple streams, reducing the overall velocity. It then directs all of the fluids to the inside diameter of the vessel shell, where the very large shell surface area acts



as a separation baffle, allowing remnant gas to readily evolve, and sending all liquids gently down into the liquids separation lower areas of the vessel.

The next key design feature is the carefully designed gas space. This space is very long, but also very shallow, on purpose. Gases flow just above the liquid level, where the velocity is such that all liquid mist droplets settle into the liquid phase below. Gas, free of nearly all liquids, exits at the end of the vessel opposite from the inlet.

As the oil and water liquids begin to traverse the long length of the vessel, they begin separating. Since it is typical that water in oil separates at approximately 2.4 times as rapidly as the separation rate of oil from water, the vessel is designed with a shallower oil layer and a deeper water layer. These layers extend from one end to the other, so both are quite substantial in volume and therefore in terms of balanced retention time. This is key to assuring that two very key events occur:

- 1. The complete separation of water from oil, to an emulsion level below the 0.5% BS&W pipeline specification.*
- 2. The complete separation of all crude oil from water, down to at least the <100 PPM oil remaining in water level.*

As the liquids move from the inlet end of the vessel to the outlet end of the vessel, they are gradually heated. Heating is accomplished by a series of electric immersion heaters staged throughout the oil layer and equally spaced. This allows for the gradual heating of the oil and emulsion layer. Heating this layer decreases the crude oil viscosity allowing for greater water-oil separation. As the oil and emulsion layer flows from one heater to the next, the water-in-oil concentration diminishes until the target value is reached.

In addition, the gradual heating of the crude oil gives the Electreater™ the ability to not only dehydrate the crude, but also to manage the RVP of the effluent crude. It is necessary to manage the RVP of crude oil today to avoid pricing penalties, or worse yet, buyers' refusals to purchase the crude.

The Electreater™ electric immersion heaters are uniquely designed to be maintained without the need for a costly shutdown. Each immersion heater is installed in a pressure cylinder which is permanently installed into the vessel. Each heating element can therefore be removed from and reinstalled into its dedicated pressure cylinder without affecting the operation of the Electreater™

Unit.

And since the heating elements are 100% electric, they can be monitored and automatically managed electronically. Using an optional downstream RVP analyzer and an optional BS&W monitor, both feeding data to a simple PLC fitted with basic control logic, the Electreater™ immersion heaters can automatically provide the right amount of heat to achieve the ideal RVP and pipeline spec BS&W levels without the need for operator intervention.

The Electreater™ is patent pending as of 2/27/2019, and has been proven in a real-world application in the Delaware basin of West Texas. The patent was developed by Bill Ball for Jim McIntosh's firm "Oil Capital NOW LLC". Both are co-inventors, and Oil Capital NOW LLC is the owner of this patent.

ABOUT THE AUTHOR



Introducing Bill Ball. Bill is an oil and gas industry innovator and holds 21 oilfield equipment patents. He has owned and managed his own consulting firm since 1992, and designed of over 50% of all USA SWD plants constructed after the turn of the century. Additionally, Bill's patented vessel designs were used in over 2,500 treater and over 1,500 high pressure separator applications by this century's premier oil and gas producer in the Eagle Ford, and have been adopted by most other major producers in the Permian Basin, Delaware Basin, Denver-Julesburg Basin, and in the Baaken.

CONTACT US

If all else fails, or if you just have a question, don't hesitate to call Bill or Jim. Jim can be reached at 918-629-5211. Bill can be reached at 918-231-9698.

PATENTED DESIGN

