

Phibro SI™ Scale Inhibitor

PRODUCT GUIDELINES

Phibro SI Scale Inhibitor is specifically formulated to help reduce scale formation prevalent in fuel ethanol plants.

Three pronged mode of action to help reduce scale formation

Threshold inhibition

- Process solution chemistry modification to favor the formation of soluble compounds vs insoluble compounds

Sequestration

- Helps control the physical and chemical interaction of potential scale forming components, which can lead to a reduction in scale formation reactions

Crystal modification

- Helps reduce the density of scale deposits that do form, making them more amorphous and less crystalline in nature
- Makes fouling that does occur easier to remove during subsequent cleaning events

Phibro SI is effective in helping reduce the formation of:

- Beer stone (calcium and magnesium oxalate)
- Struvite
- Calcium and magnesium phytates
- Combined organic and inorganic deposits

Product Plant Application

Phibro SI is applied to plant process flows just upstream from areas where significant fouling has occurred.

Typical Applications Include:

- Evaporators
- Heat Exchangers
- Boilers
- Distillation equipment
- Oil separation systems
- Process Lines

Regulatory

Phibro SI is Generally Reconized as Safe (GRAS) and therefore suitable for use under the Food and Safety Modernization Act (FSMA).



Product Dosing

- Recommended dosing range is 20 – 40 ppm on a continuous feed basis.
- Dosing level is dependent on application point and solution chemistry.

Phibro SI™ and Phibro AC™ Scale Control System

For best results in controlling scale formation, Phibro recommends the use of *Phibro SI* scale inhibitor in combination with *Phibro AC* acid cleaning solution.

The scale inhibition and modification action of *Phibro SI*, combined with the cleaning power of *Phibro AC*, offers a dual approach to help minimize plant fouling and optimize plant performance.

Improved Plant Performance

Evaluation was conducted at an ICM designed plant with 8 evaporators. (Evap order 8, 1-7) Pre-trial data based on sulfamic acid and competitive scale inhibitor

Product Dosing

Phibro SI: Continuous dose at 30 ppm into Evap 8

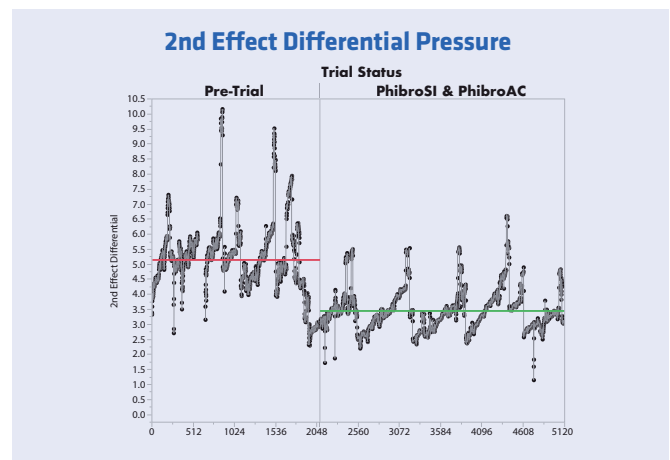
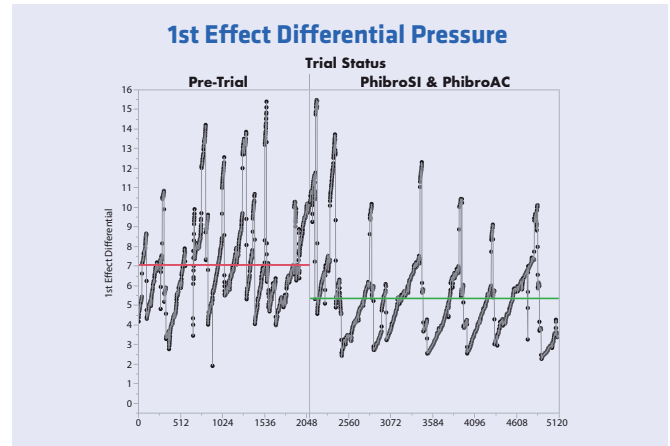
Phibro AC: 0.5% concentration

Results

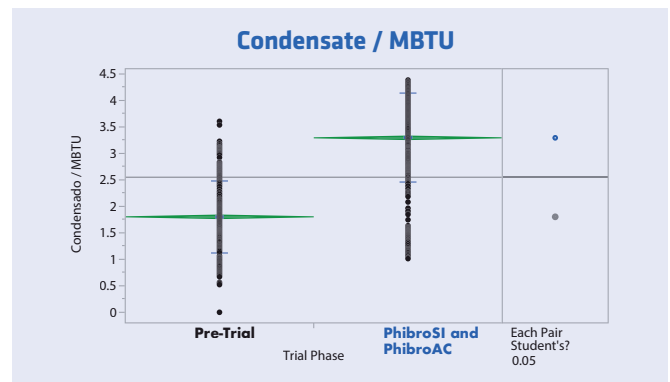
- Evaporator efficiency has increased significantly with better heat transfer
- Differential pressures have decreased while beer feed rate has stayed the same
- Condensate flows have significantly increased with reduced energy input per gallon produced
- Scheduled bi-annual hydroblasting cancelled based on positive performance results

Call your Phibro representative to see if *Phibro SI* is right for you.

Evaporator pressures decreased indicating more effective scale removal and control



Condensate flows increased with reduced energy input per gallon produced



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