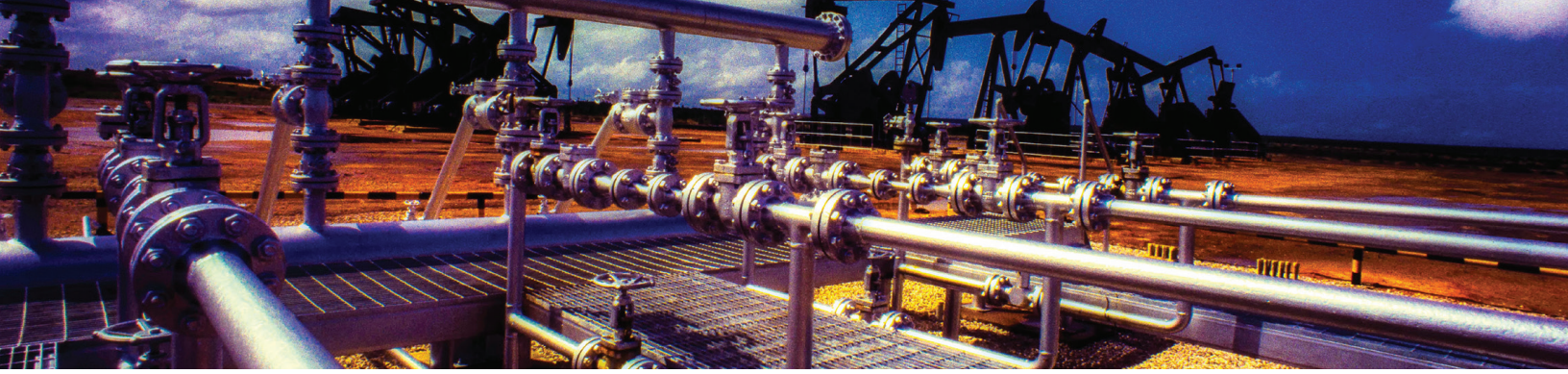


CERIFLOW® 5000 Series Phenolic Resins are Top Performers in Controlling Asphaltene Deposition

Asphaltenes are complex molecular structures which may precipitate from crude oil during production, possibly leading to flow assurance issues. Asphaltene instability and deposition can be a very challenging problem in the industry, and can be caused by depressurization during production, pH change from acidizing, CO_2 flooding, or high temperature environments such as heat exchangers. Additionally, asphaltenes may have polar fractions, allowing them to be interfacially active which can lead to emulsion formation.

Asphaltene Treatment Methods

In general, there are two methods to control asphaltene deposition issues in the field, each requiring different chemistries:

- Dispersion–breaking up existing deposits by loosening thick and settled asphaltene
- Inhibition–reducing or preventing deposition on surfaces

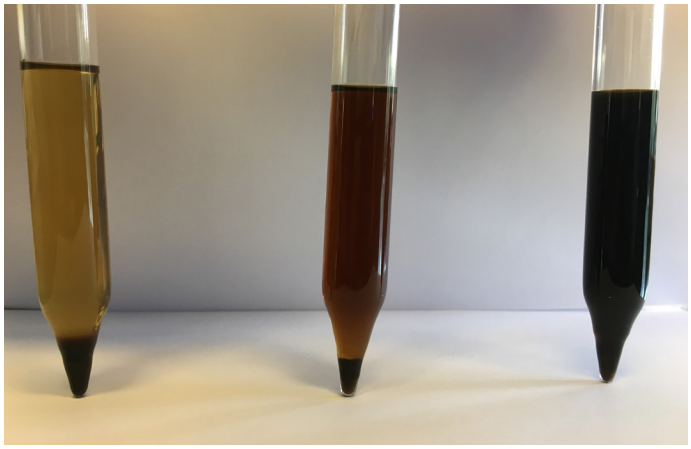
SI Group's CERIFLOW® phenolic resins provide solutions for asphaltene inhibition and can be used in many applications. Our ability to control chemical and physical properties offers targeted options in our CERIFLOW 5000 series. These products mitigate risk, and can be used in conventional, unconventional, and deepwater oilfield applications.

Asphaltene Inhibitor Testing

SI Group has been closely evaluating asphaltene inhibitor products using different test methods. One method, used in a laboratory, is the Asphaltene Dispersency Test (ADT). The ADT test method prescribes the dosage of crude oil samples with various concentrations of asphaltene inhibitors, while leaving one sample untreated to remain as a test "blank". An untreated sample will have a higher amount of destabilized asphaltenes, causing them to precipitate from solution and result in a lighter color solution with a higher level of transmittance through it (left image in Figure 1). A treated sample will have a lower amount of destabilized asphaltenes, keeping them soluble or suspended in the solution resulting in a darker color and a lower level of transmittance through it (middle and right images in Figure 1).

Asphaltenes in destabilized samples will aggregate and precipitate, allowing more light transmittance through the fluid. Asphaltenes in stabilized samples will remain soluble or dispersed and allow less light transmittance through the fluid.

Figure 1. ADT Testing



Example of heptane-destabilized crude oil untreated (left) and treated (middle and right) with asphaltene inhibitor products.

The ADT test was conducted using several commercial CERIFLOW products, including CERIFLOW 5100, CERIFLOW 5200 and CERIFLOW 5300 on asphaltenic crude oil from San Joaquin Valley. The results are illustrated in Figure 2.

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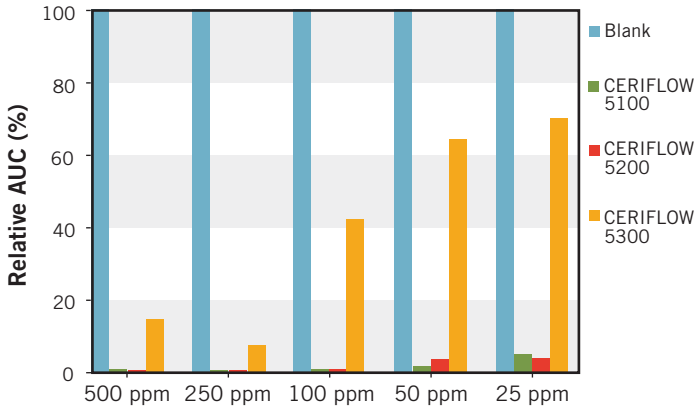
Figure 2. Testing Results - San Joaquin Valley Crude Oil



The blank, untreated sample establishes the maximum amount of asphaltene destabilization and sets the % Area Under the Curve at 100%. All product performance percentages are relative to the blank performance. Each CERIFLOW asphaltene inhibitor showed great performance at both 500 and 250 ppm treatment rates. CERIFLOW 5100 and CERIFLOW 5200 demonstrated an excellent performance range, even down to 25 ppm treatment rate.

All CERIFLOW products are delivered at 50% activity, and can be diluted and blended with other oil soluble products to provide high-performance finished products.

Continued Asphaltene Treatment Testing

SI Group continues to design and test phenolic resins for asphaltene treatment applications. By controlling chemical and physical properties, SI Group advances their understanding of phenolic resin treatment of asphaltene challenges in a variety of crudes around the world.

What This Means for You

SI Group's CERIFLOW 5000 series products are designed specifically to solve asphaltene inhibition problems in oilfield applications. Our products demonstrate exceptional performance in asphaltenic crude oils using industry standard testing methods. We continue to evolve testing capabilities to evaluate product performance and treat asphaltene instability. For more information about our CERIFLOW products, or to test in the field, please contact your local sales representative or our Oilfield team at oilfield@siigroup.com.

SI Group
www.siigroup.com

SI Group, Inc. North America
Corporate Headquarters
2750 Balltown Road
Schenectady, NY 12301, U.S.A.
Tel: +1 518.347.4200

Brazil – Rio Claro
Tel: +55 19.3535.6700

China – Shanghai
Tel: +86 21.2422.9200

England – Wolverhampton
Tel: +44 1902.790.555

Korea – Seoul
Tel: +82.2.6937.8900

France – Bethune
Tel: +33 3.21.68.67.67

India – Navi Mumbai
Tel: +91 22.6673.2000

Singapore
Tel: +65 6506.2900

South Africa – Johannesburg
Tel: +27 11.389.8200

Switzerland – Pratteln
Tel: +41 61.825.81.11