

Solids Precipitation Inhibitor 2400

A concentrated solvent additive that remedies asphaltene deposition and other formation problems associated with oil and gas production. It may also be used in conjunction with CO₂.

Overview

Solids precipitation from reservoir crudes has been recognized as a serious detriment in numerous oil systems. Precipitation may result in insitu permeability reductions as well as contributing to serious plugging problems in production wells and surface facilities. A small addition of SPI 2400 (2% - 4% by weight) to the solvent or CO₂ is all that is required to eliminate or to reduce asphaltene precipitation problems.

SPI 2400 is a non-ionic oil soluble compound that is stable at a high temperature (up to 350⁰C). SPI 2400 displays strong water wetting tendencies from its combined hydrophilic/hydrophobic nature, maintaining a preferentially water wet environment.

SPI 2400 can be successfully applied to a whole range of reservoir brine salinities with no adverse effects on product performance. Non-ionic compounds are not significantly affected by the presence of water-soluble salts irrespective of their (salts) concentration. In addition, SPI 2400 is an efficient penetrating and dispersing agent.

The technology was developed as a joint venture by Rocanda Enterprises Ltd. and Buckman Laboratories of Canada, Ltd. for asphaltene inhibition. This new technology represents "state of the art" development on how to deal with asphaltene deposition in both down hole and surface wells.

The principle of this technology is that the SPI 2400 molecule, when in contact with the oil prior to asphaltene precipitation, will simply not allow the asphaltene molecule to collapse into a solid particle, even when both temperature and pressure are reduced. In the event that precipitation has already occurred, SPI will solubilise and hold it in solution.

Both laboratory and field tests have proven that blends containing SPI 2400 are vastly superior when compared to straight solvents such as xylene and toluene, and carry two to three times more asphaltene in solution. In addition, SPI 2400 is a very strong dispersant and penetrant. SPI 2400 is compatible with most aromatic solvents.

The results of high-pressure viscosity measurements on CO₂ with and without SPI 2400 at 4100 psig and 130⁰C are 0.069cP and 0.043cP respectively.

Experimental Data

Test results for the measurement of solids precipitation at reservoir conditions, temperature and pressure are presented in Figures 1 and 2. The measurements were conducted in a high pressure, high temperature laser cell.

When SPI 2400 was added to the solvent or CO₂ it showed consistently better results, shifting the precipitation point. See Figures 1 and 2. SPI 2400 was also found to be superior in preventing in situ solids precipitation as compared to xylene.

Due to the number of dependencies in each oil/solvent system considered, including temperature and pressure influence, it is recommended that an optimal addition of SPI 2400 to each specific application be established prior to the application.

Figure 1

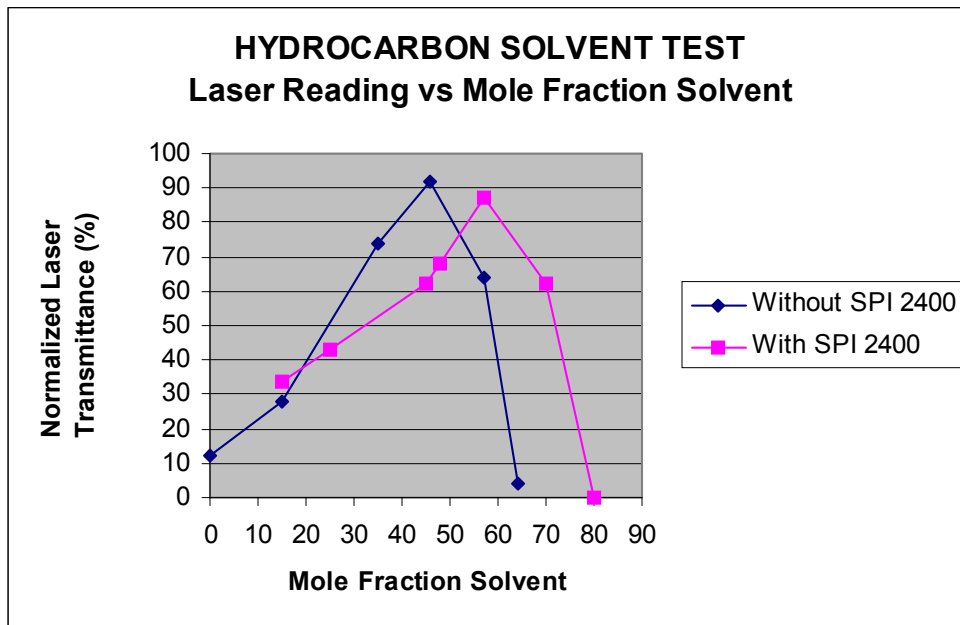
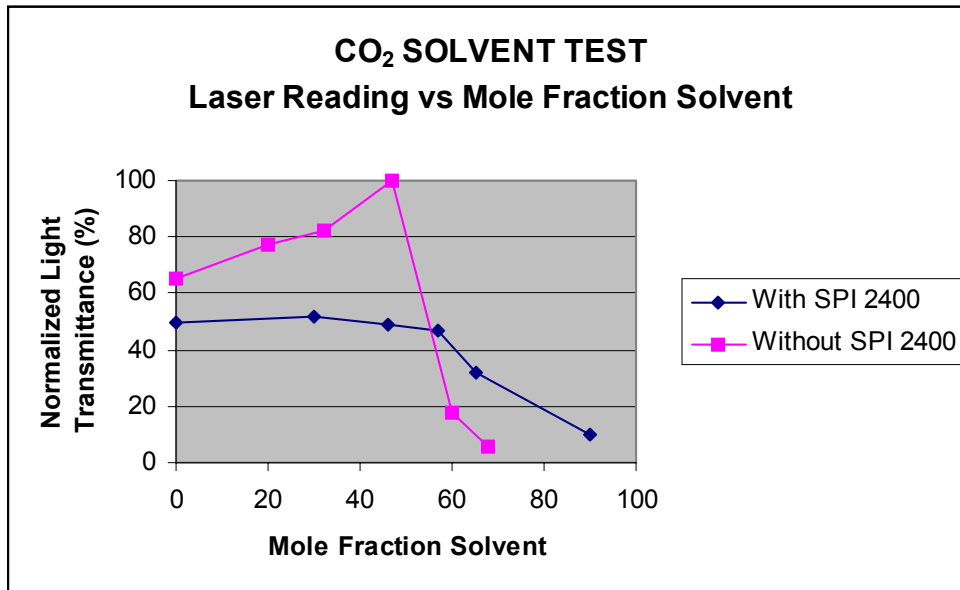


Figure 2



Advantages

1. Resuspends asphaltenes by mimicking the natural resins of heavy oil
2. Penetrates, disperses, and dissolves sludges and asphaltenic deposits.
3. Breaks water in oil emulsions and water blocks by reducing the interfacial tension that exists between the oil and water phases
4. Coats sand and clay solids and leaves the particles water wet
5. Significantly reduces viscosity of heavy oil
6. Provides corrosion control by forming a protective film on metal surfaces
7. Highly concentrated formulation, thus, a little goes a long way
8. Compatible with heavy oil and lighter gravity crudes
9. Critical control procedure not required because over-treatment will not result in formation of troublesome deposits

Field Applications

1. Continuous injection of SPI 2400 down the annulus of a production well. The amount of chemical injected will vary between 50 and 100 ppm. The amount of SPI 2400 will depend on the asphaltene content in the crude.
2. Continuous injection of SPI 2400 down the annulus of a production well as a part of a solvent blend. Typically the injected solvent will contain between 2% and 4% by weight SPI 2400. The amount of SPI 2400 will depend on the asphaltene content in the crude.
3. Prevention of asphaltene precipitation in miscible floods.
4. An addition of 3.0% SPI 2400 to CO² increases its viscosity by approximately 50%.
5. Eliminating the need for trucking slop oil from the field tanks and reducing operating costs by using the SPI 2400 product at the wellhead and having all the slop produced at one point, at the plant. SPI 2400 will also improve the separation of oil/water emulsions at higher temperatures, approximately 90°C +, by reducing the IFT of oil.

The application of SPI 2400 at the wellhead should not interfere with your current system of producing sales oil in the field.

Product Characteristics

Density at 25 ⁰ C	0.90 g/mL
Approximate volume per kg	1110 mL
Flash point (TCC)	>135 ⁰ C
Freezing Point	-19 ⁰ C
pH (100 ppm)	Same as pH of water in which dispersed

Packaging and Handling

SPI 2400 is a liquid packaged in non-returnable drums or semi-bulk containers. Materials suitable for storing and handling the product include ferrous metals, Penton, Polypropylene, molded nylon and Teflon.

In concentrated form, SPI 2400 can have an adverse affect on rubber, polyvinyl chloride, acrylics and certain other plastics.

SPI 2400 is biodegradable and has a very low order of toxicity to warm-blooded animals. It is not generally irritation to the skin, but as a general precaution, workmen should avoid

prolonged contact with the product, avoid contamination of food, and wash with soap and water after handling the product.

Observe all safety precautions shown on the label and in the Material Safety Data Sheet.

Recommendations given in this bulletin are based on tests believed to be reliable. However, the use of the product is beyond the control of Buckman Laboratories, and no guarantees, expressed or implied, are made as to the effects of such or the results to be obtained if not used in accordance with directions or established safe practice. The buyer must assume all responsibility, including injury or damage, resulting from misuse of the product as such, or in combination with other material. This bulletin is not to be taken as a license to operate under or recommendation to infringe any patent.

Buckman Laboratories are located in Argentina, Australia, Austria, Belgium, Brazil, Canada, France, Germany, Italy, Japan, Mexico, Portugal, Singapore, South Africa, Spain, United Kingdom and U.S.A.
