

**CORROSION INHIBITOR
CONCENTRATES CATALOG**





PETROSTEP® CORROSION INHIBITOR CONCENTRATES

Corrosion inhibitors used in oil and gas production, processing and transportation are typically multicomponent blends containing several active components, formulation aids, and surfactants in a solvent package. Stepan Oilfield Solutions offers a variety of water- and oil-soluble corrosion inhibitor concentrates for continuous and batch treatment applications.

PETROSTEP FC-OS1: OIL-SOLUBLE CORROSION INHIBITOR CONCENTRATE

Oil-soluble corrosion inhibitors form a more persistent protective film on metal surfaces than those that are water-soluble. The protective film keeps corrosive species away from the metal surface, making it effective against carbon dioxide (CO₂) and hydrogen sulfide (H₂S) corrosion.

PETROSTEP FC-OS1 is an oil-soluble corrosion inhibitor that is:

- A dimer/trimer acid-based formulation
- Designed for batch treatments
- Applicable for sweet and sour environments

PRODUCT PROPERTIES AND APPLICATION RECOMMENDATIONS

TYPICAL PROPERTIES

- Actives (%): 63
- Density at 25°C (g/ml): 0.92
- Flash point, PMCC (°C): 35
- Freeze point (°C): -15
- Viscosity at 25°C (cps): 1,110
- Viscosity at 40°C (cps): 455

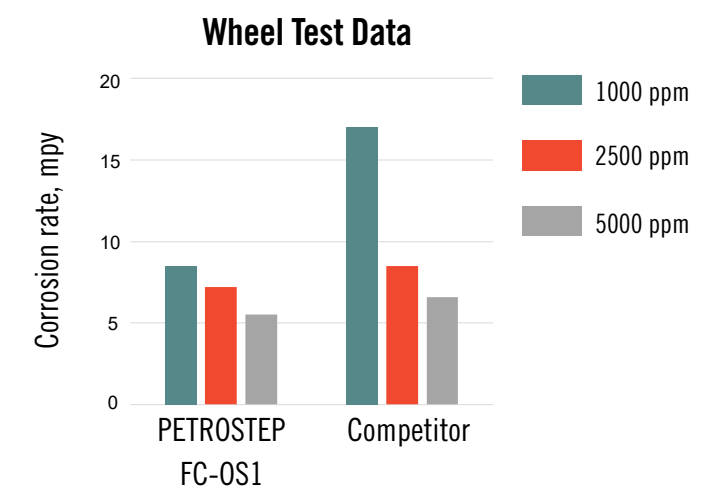
RECOMMENDED TREATMENT RATE

- Blend down to a desired field-use concentration using appropriate solvent(s).
- Adjust dosage according to corrosion monitoring data to meet a desired target corrosion rate.

During the Wheel Test, PETROSTEP FC-OS1 was found to have comparable performance to a competitive product.

The test was performed under the following sweet conditions:

- 35% active corrosion inhibitor solution
- 6.6% sodium chloride, NaCl, 0.35% calcium chloride, CaCl₂, brine
- Synthetic hydrocarbon LVT-200 used as oil phase
- 90:10 brine/oil ratio
- CO₂ saturated test fluid
- 66°C environment
- 24-hour duration



PETROSTEP FC-WS1: WATER-SOLUBLE CORROSION INHIBITOR

PETROSTEP FC-WS1 is a water-soluble corrosion inhibitor blend used for continuous treatment. It is:

- Cationic
- Thermally stable up to 150°C
- Generally compatible with nonionic and cationic additives
- Applicable for sweet and sour environments

PRODUCT PROPERTIES AND APPLICATION RECOMMENDATIONS

TYPICAL PROPERTIES

- Activity (%): 80
- pH (10% aqueous): 4.2
- Density (g/ml): 0.99
- Flash point (°C): 40
- Pour point (°C): -57
- Freeze point (°C): -58
- Viscosity at 25°C (cps): 125

RECOMMENDED TREATMENT RATE

- Blend down to a desired field-use concentration using appropriate solvent(s).
- Adjust dosage according to corrosion monitoring data to meet a desired target corrosion rate.

PETROSTEP FC-WS1 was found to have comparable performance to a competitive product used in the Middle East in Wheel and Rotating Cage Autoclave tests. For these tests, PETROSTEP FC-WS1 was diluted to match the activity of the competitive product.

The tests were performed under the following conditions:

- High salinity brine (TDS 188,952 mg/L)
- Synthetic hydrocarbon LVT-200 used as oil phase
- 90:10 brine/oil ratio
- 80°C environment
- 24 hours duration
- CO₂ saturated test fluid (Wheel Test)
- 50 psi CO₂ (RCA test)
- 150 Pa shear stress (RCA test)

FIGURE 1

Wheel Test Data

Competitor
PETROSTEP FC-WS1

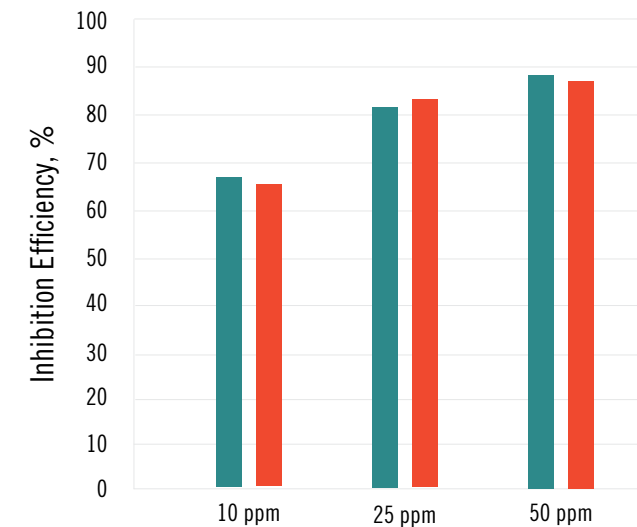
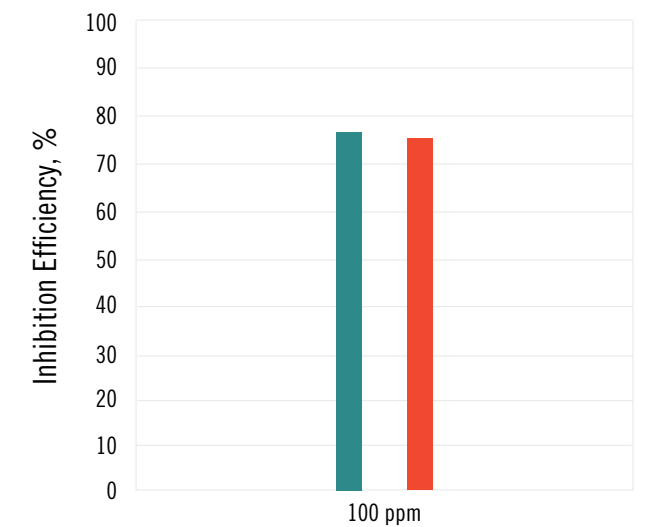


FIGURE 2

Rotating Cage Autoclave (RCA) Test Data

Competitor
PETROSTEP FC-WS1



The results presented in Figure 1 and Figure 2 demonstrates comparable performance of PETROSTEP FC-WS1 to a competitive product.



PETROSTEP FC-WS2: WATER-SOLUBLE CORROSION INHIBITOR CONCENTRATE

PETROSTEP FC-WS2 is a water-soluble corrosion inhibitor blend used for continuous treatment. It is:

- Anionic
- Thermally stable up to 121°C
- Generally compatible with nonionic and anionic additives
- Applicable for sweet and sour conditions

PRODUCT PROPERTIES AND APPLICATION RECOMMENDATIONS

TYPICAL PROPERTIES

- Active (%): 60
- pH (10% aqueous): 1.73
- Density at 25°C (g/ml): 1.02
- Flash point, PMCC (°C): 65
- Pour point (°C): -39
- Freeze point (°C): -39
- Viscosity at 25°C (cps): 241

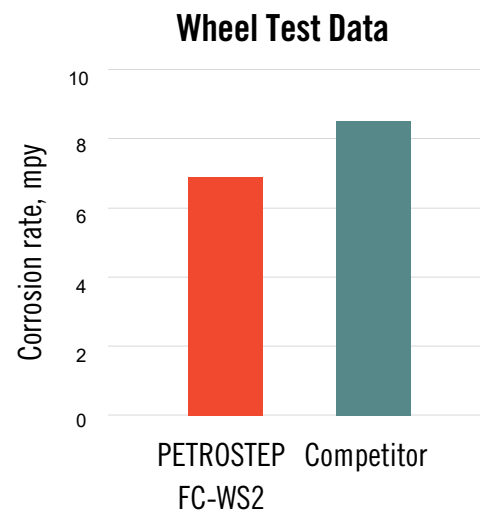
RECOMMENDED TREATMENT RATE

- Blend down to a desired field-use concentration using appropriate solvent(s).
- Adjust dosage according to corrosion monitoring data to meet a desired target corrosion rate.

During the Wheel Test, PETROSTEP FC-WS2 was found to have comparable performance to a competitive product under sour conditions.

The test was performed under the following conditions:

- 25 ppm, 35% active solution
- 6.6% sodium chloride (NaCl), 0.35% calcium chloride (CaCl₂) brine
- 500 ppm H₂S
- 66°C environment
- 24-hour duration



PETROSTEP FC-WS3: HIGH-TEMPERATURE, WATER-SOLUBLE CORROSION INHIBITOR CONCENTRATE

At temperatures above 121°C, many standard corrosion inhibitor actives such as quaternary amines and phosphate esters are no longer thermally stable and stop providing desired protection against corrosion.

PETROSTEP FC-WS3 is:

- Thermally stable up to 177°C
- Applicable for sweet and sour conditions
- Generally compatible with nonionic and cationic additives

PRODUCT PROPERTIES AND APPLICATION RECOMMENDATIONS

TYPICAL PROPERTIES

- Active (%): 43
- pH (10% aqueous): 9.05
- Density at 25°C (g/ml): 1.03
- Flash point, PMCC (°C): 38
- Pour point (°C): -23
- Freeze point (°C): -24
- Viscosity at 25°C (cps): 60

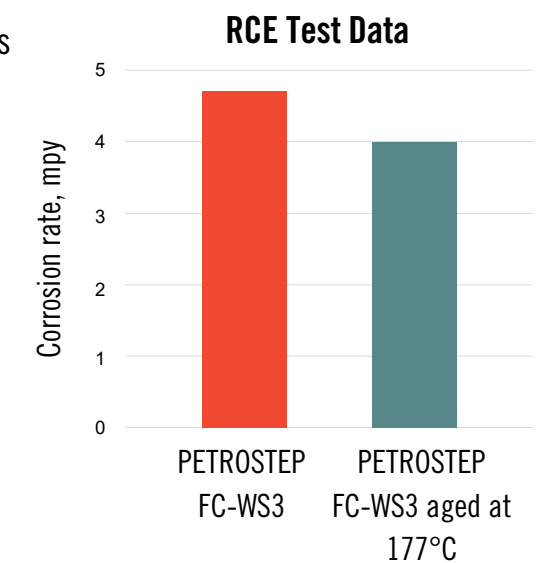
RECOMMENDED TREATMENT RATE

- Blend down to a desired field-use concentration using appropriate solvent(s).
- Adjust dosage according to corrosion monitoring data to meet a desired target corrosion rate.

PETROSTEP FC-WS3 was heat stressed at 177°C for 24 hours. Then its performance was compared to an unstressed sample of PETROSTEP FC-WS3 using the Rotating Cylinder Electrode (RCE) test.

The RCE test was performed under the following conditions:

- 25 ppm, 35% active corrosion inhibitor solution
- 3.5% NaCl, 0.11% CaCl₂, 0.07% MgCl₂ brine
- CO₂ sparge
- 80°C environment
- 24 hour duration





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