

**Stepan**   
OILFIELD SOLUTIONS

# PETROSTEP<sup>®</sup> VES-1

*Viscosifier*



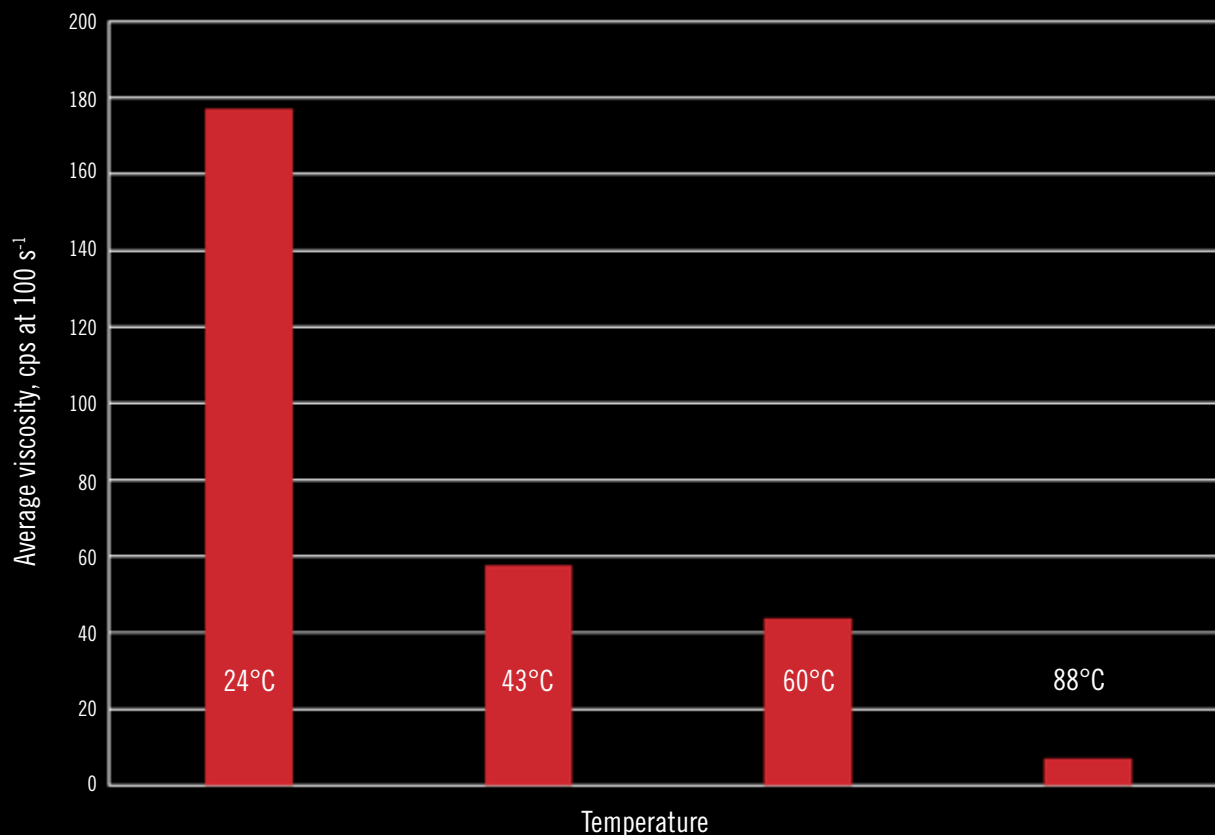
Viscoelastic surfactants (VES) provide a polymer-free way to viscosify fluids for a range of oilfield applications, including stimulation treatments and wellbore cleanouts. These fluids are water soluble and will not leave insoluble polymer deposits in the formation.

Stepan Oilfield Solutions' PETROSTEP VES-1 can be used to build shear-thinning fluids that are effective at suspending solid particles under low shear conditions. The presence of the viscosifying surfactants also lowers the surface tension and may reduce the need for additional flow-back surfactants. Fluid viscosity can be adjusted by modifying PETROSTEP VES-1 concentration and water salinity.

Figure 1 shows the effect of temperature on the viscosity of a 2 wt% PETROSTEP VES-1 gel in water containing 1 wt% PETROSTEP VES-CI1 and 2 wt% potassium chloride (KCl). PETROSTEP VES-1 can be used to viscosify water containing 1 – 10 wt% KCl and can maintain gel viscosities over 100 cps at 100 s<sup>-1</sup> up to at least 40°C.

**FIGURE 1**

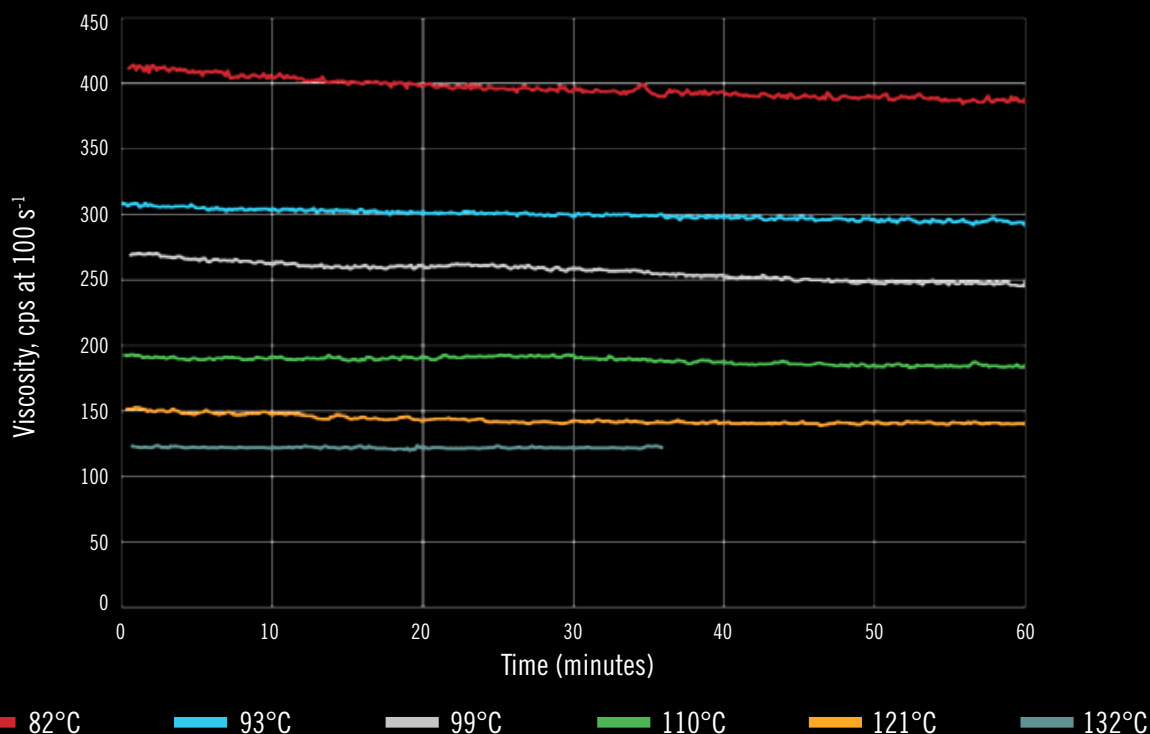
Gel Viscosity of 2 wt% PETROSTEP VES-1 and 1 wt% PETROSTEP VES-CI1  
in 2 wt% KCl (Grace M5600 Viscometer)



PETROSTEP VES-1 may also be incorporated into foamed fluid systems to provide viscous, stable foams at elevated pressures and temperatures, as shown in Figure 2. Foaming the PETROSTEP VES-1 system can provide higher viscosities than the base VES gel at equivalent surfactant loadings, and may be used in applications requiring improved high temperature viscosity.

## FIGURE 2

Foam Viscosity of 2 wt% PETROSTEP VES-1 and 1 wt% PETROSTEP VES-C11 in 2 wt% KCl, 70% Foam Quality with N<sub>2</sub> at 2,500 psi (Chandler 8500 Foam Rheometer)



### TYPICAL PROPERTIES

- pH (10% in water): 7.5
- Viscosity at 25°C, cps: 68
- Density at 25°C, g/mL: 0.897
- Freezing Point: -12°C
- Flash Point (PMCC): 25.6°C

### APPLICATIONS

Viscosification of aqueous fluids and formation of a stable foam under pressure.

### DIRECTIONS FOR USE

- Use PETROSTEP VES-1 in combination with PETROSTEP VES-C11, VES-C12 or VES-C13.
- Incorporate product combination into base fluid and mix thoroughly; contact Stepan Oilfield Solutions for further guidance regarding specific applications.
- Adjust product concentrations and salinity to meet viscosity requirements.

For more information about PETROSTEP VES-1 and other PETROSTEP products, email [oilfield@stepan.com](mailto:oilfield@stepan.com) or call 713.955.8100.



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