Ascend™ Surfactant Solutions

CUSTOMIZABLE, DUAL-COMPONENT SURFACTANT PACKAGES TO UNLOCK DEEP, TRAPPED HYDROCARBONS

OVERVIEW
Multi-Chem’s Ascend™ surfactants are multi-functional wetting agents with enhanced penetration capabilities which solubilize oil and reduce interfacial tension between oil and water, allowing for increased mobility of hydrocarbon molecules. Gas bubbles and kerogen gums are removed from surfaces and rigid interfacial water-gas and water-oil films are fluidized, allowing more bubbles and droplets to squeeze through smaller pores. Ascend surfactants are designed to increase the penetration of the fracturing fluid, providing more access to the reservoir and trapped oil.

Traditional surfactant chemistry tends to be adsorbed, sometimes as much as 99%, before it can travel the full length of the fracture. This early loss of surfactant chemistry can significantly reduce the effectiveness of the overall fracturing fluid thus making the process uneconomical. Ascend surfactants resolve the adsorption issue through customized chemical systems. Along with our advanced surfactant chemistry, additional components are incorporated which enable the surfactant to reach further into the rock matrix to access additional reserves as show in Figure 1.

APPLICATIONS
» Applied during hydraulic fracturing
» Compatible with a wide range of reservoirs with thermal stability to 350°F (177°C)

FEATURES
» Tailored surfactant chemistry for specific reservoir characteristics
» Optimal interaction with broader API gravity range of oils to increase fluid mobility through reservoirs
» Proven compatibility with all major gel systems and friction reducers

BENEFITS
» Multi-functional surfactant blend
» Minimized surfactant loss (reduced adsorption near the wellbore region)
» Enhanced contact area between fracturing fluids and formation reservoir
» Significant wettability alteration
» Yields higher initial production and greater estimated ultimate recovery
» Optimized usage rates minimize costs and maximize returns
» Increased fluid mobility improves lift efficiency, extending pump life

Figure 1

 ascendiftm surfactant solution
APPLICATION

Oil recovery laboratory results reveal that surfactants extract more oil in the presence of the sacrificial agent. Each sacrificial agent and surfactant combination is selected and specifically-formulated based on core sample testing, resulting in a custom-tailored solution that takes into account unique reservoir characteristics and specific environmental requirements. Field trial data shows improved oil recovery when the Ascend surfactant package has been utilized as compared to wells with surfactant alone or no surfactant.

Based on pressurized column flow testing averages, Ascend surfactant outperforms most other surfactant technology on the market today. In the laboratory testing on Eagle Ford Shale oil, as shown in Figure 2, Multi-Chem’s RockOn® weakly-emulsifying surfactant demonstrates outstanding oil recovery at 20%. The Ascend surfactant package increases penetration of the surfactant into the formation resulting in an additional 10% to reach a total of 30% estimated oil recovery.

Figure 2

![Figure 2](image)

COMPATIBILITIES

Ascend surfactant series is compatible with most stimulation chemicals. Because compatibility depends on chemical concentrations, Ascend surfactant should always be tested for compatibility when used with other materials, and particularly, with cationic materials.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com/multichem