millennium energy
Drilling Fluids & Chemicals

PRODUCTS TECHNICAL DATA

1. PRODUCT NAME : Sulphonated asphalt

COMPOSITION / INFORMATION ON INGREDIENTS AND APPLICATIONS ME-ASPHASOL Sulphonated asphalt is a Acid soluble and water soluble. High purity Sulphonated asphalt product is made by solvent full Sulphonation. ME-ASPHASOL Sulphonic acid of asphalt + NaOH → Sodium asphalt sulphonate; Sulfonic acid of asphalt + KOH → Potassium asphalt sulphonate . Compared with ordinary modified asphalt, its molecular chain itself contains many adsorption groups, which can be effectively plugged on the surface of shale by electrical adsorption. It is not affected by formation temperature and asphalt softening point. can be well dispersed in various water-based drilling fluids, which can effectively inhibit the hydration of drilling debris and stabilize the cutting force of drilling fluid; Good plugging effect, can greatly improve the quality of mud cake, temperature resistance 200℃, effectively control high temperature and high pressure filtration loss; giving particles that are relatively coarse and quite narrow in particle size distribution. ME-ASPHASOL additive being a sulphonated/reacted material, has a wide range of particle sizes ranging from soluble to colloidal to the size one would expect from ground materials. This wide range of sizes provides a high probability of having the proper particle size to fit into the variety of fracture sites. Virtually all ME-ASPHASOL additive particles, regardless of size, are highly anionic.

QUICK REFERENCE GUIDE	FOR APPLYING ME-ASPHASOL ADDITIVE
Application	Material Needed
Stabilize shale formations	9 to 17kg/m3
Impart lubricity	3 to 9 kg/me
Reduce torque & drag	3 to 9 kg/me
Control HTHP fluid loss	6 to 17kg/m3
Thin,strong, compressible wall cakes	6 to 11kg/m3
Emulsify oil into water-based mud system	2 to 9kg/m3
General hole conditioning (Differential sticking)	6 to 17kg/m3

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Application Case History

Shale inhibition for HTHP shale gas well : ME-ASPHASOL Sulfonated Asphalt

CNPC Chuanqing Exploration-- Longmaxi Gas Field Sichuan province

Operator : CNPC Chuanqing Exploration company

The shale gas formation is deeply buried, and the clay structure basically does not contain montmorillonite and I/Montmorillonite. Therefore, the hydration instability mechanism is different, and surface hydration is the main reason for the borehole instability.

The tradition shale inhibitor for borehole hydration instability was adopted, that was sodium silicate and amine compounds, and adopted salts such as potassium chloride, potassium formate and organic compounds such as glycerol to adjust the drilling fluid activity , so as to inhibit the shale hydration expansion and dispersion. The result was failed with limited effect and cause waste of treating additives.

Polycarbonol can reduce the free energy of shale surface, inhibit shale surface hydration, change the wettability of shale, enhance the hydrophobicity of shale, significantly inhibit the hydration, expansion and dispersion of shale and slow down the decrease of shale compressive strength.The Potassium asphalt sulfonate of ME-ASPHASOL can effectively block the pore throat, microcrack and fracture of shale.Finally, finally CNPC Chuanqing changed to polycarbonyl alcohol and ME-ASPHASOL as the core treatment agent, with filtration loss reducer, lubricant, etc. They designed the new formulation as: 2% bentonite +3% polycarbon alcohol +3% Potassium asphalt sulfonate of ME-ASPHASOL +0.1%NaOH+1% Filtration Control agent AC +0.05%KPAM+4%Fluid loss agent SP+1% lubricant + Barite.

The result by the new formulation successfully inhibited the hydration expansion of shale, and the expansion rate of shale in the new water-based drilling fluid was close to the expansion rate in base drilling fluid.