

## PRODUCTS TECHNICAL DATA

### 1. PRODUCT NAME : ME-EMULS Compound Emulsifier

#### COMPOSITION / INFORMATION ON INGREDIENTS AND APPLICATIONS

ME-EMULS , it's made of fatty organic acid and organic amines mix and has an Amide reaction , then has polymerization with carboxylic acid to form polyamide carboxylic acid that's ME-EMULS .By adsorption on the surface of clay, the structure of clay-amine is formed to prevent the rupture of emulsion, so that the clay has oil wettability and improves the gelation strength and reduces the filtration loss . It's compatible use in diesel oil, mineral oil and synthetic oil.

Emulsion in synthetic at 120°C ,the emulsification performance is highest at 120~180°C and the demulsification voltage is the highest .The emulsifying properties decreased slightly at 200~240 cc, but still maintain a high electrical footprint. This suggests that appropriate warming is beneficial The main and auxiliary emulsifiers are fully dispersed in the oil-water system and in the oil-water boundary .The surface forms a dense and stable composite interface mask to make the oil-water system more stable Yes. Because the molecular weight of the prepared emulsifier is larger than that of the traditional emulsifier, And the structure is stable multi-joint point arc comb structure, main and auxiliary milk .The main and auxiliary emulsion composite film is formed between chemicals, which greatly reduces the thermal motion amplitude and the thermal decomposition probability of emulsifier molecules at high temperature .

While ME-EMULS is used to make Synthetic oil based invert emulsion fluid with density 2.3g/cm<sup>3</sup>, at 220°C the demulsification Pressure reaches to 1000V up, barite does not precipitate and has Lower HTHP filtration loss, indicating that ME-EMULS emulsifier has good emulsification and high temperature resistance. Density: 0.95. Temperature resistance: up to 220°C

#### PHYSICAL AND CHEMICAL PROPERTIES

Items	Index
Appearance	A viscous liquid
Precipitation WATER ml, at room temperature setting for 8h, After 240°C/16h,	0
Precipitation OIL ml, at room temperature setting for 8h, After 240°C/16h,	≤15
Demulsification voltage (Adding 1%) V	≥600



## 2. PRODUCT NAME : ME-TROL HT400

### COMPOSITION / INFORMATION ON INGREDIENTS AND APPLICATIONS

#### ME-TROL HT400

This filtration control agents is a kind of oil-based mud modified Gilsonite. It can inhibit the dispersion of drilling cuttings, control HTHP filtration, produce thin and dense mud cake, maintain low shear rate under HTHP, reduce the transmission of pore pressure and seal micro fractures and low porosity sand. Keep formation integrity and develop effective filter cake. Because the decomposition temperature of the product is as high as 275 °F, highly-dispersive and fractured shales with sloughing tendencies, hard, brittle shales in which moderate dispersion exhibits severe sloughing, a high-strength adsorption membrane is formed on the surface of mud cake. The plugging principle is used to reduce the permeability of mud cake, improve the quality of mud cake and reduce the filtration loss.

ME-TROL HT400 can resistant to high formation temperature up to 400F°,it have been widely used for many OBM to stabilize sloughing shales to reduce borehole erosion. It is proposed that the material, added to a OBM system prior to encountering a problem shale, would penetrate the shale pore spaces, microfractures, and bedding planes as the bit is penetrating the formation. By a plastic-flow mechanism, ME-TROL HT400 would extrude into the pores, fractures, and bedding planes to reduce or minimize filtrate and whole mud invasion, and thus bond the matrix to prevent sloughing. CNPC had reported that ME-TROL HT400 was superior to the blown asphaltic-type additives because of its higher softening point and fewer impurities. Their paper contained photomicrographs of drilled cuttings and cores which showed ME-TROL HT400 extruding into pore spaces and fractures. In addition, it has been proposed that ME-TROL HT400 plates out on the borehole wall, creating a thin film. However, penetrate deeper into the fractures, due to their high solubility, and do not "plate" as well as the insoluble products.

Product in different temperature environments	Application	Corresponding well-known brands
ME-TROL HT400	Self softening point: 180-200 ° C. The filtration loss of HTHP is less than 7.0ml at 220 ° C and 3.5Mpa pressure difference for 30min.	VERSATROL HT (SL) /Barablok400
High chemical stability, good filtration performance, good wall-building, good plugging .		

## Application Case History

### Lost circulation & Pipe struck: ME-TROL HT400 + ME-EMULS / Xinjiang

#### Beiken-- Tarim Piedmont, Well #243,244

Operator : Xinjiang Beken Drilling Co. In 2018.

Gas well location: Tarim piedmont, Xinjiang province. Well # 243, 244.

Formation profile: Deeper salt zone, strata temperature was high (up to 200°C), strata pressure was high (up to 130MPa), the maximum depth reached to 8000 meters, average porosity 4.7, average permeability 0.055 md, was HTHP fracture tight sandstone reservoir .

Oil-based drilling fluid was adopted, but high-pressure brine intruded during drilling operation that resulting in deterioration of drilling fluid as well pipe - stuck happened. In their original designed formulation of mud, sulfonated asphalt & SDBS Emulsifier was selected and made the high density Diesel based OBM :

2.0% Organic Clay +8.0% Emulsifier +4.0% Sulfonated Asphalt +5.0% CaO+ barite, Oil- Salt water ratio of 90 : 10, Density 2.00 kg/L.

The compatibility of sulfonated asphalt and base solution is poor, sedimentation and de-mulsification occurs after addition. The emulsifier had poor salt resistance and de-mulsification occurred. Down hole brine overflow occurred and filtration loss increased.

And ME-TROL HT 400 and ME-EMULS has good compatibility with base fluid, not only the suspension of barite but also the shear value performs well.

ME-TROL HT 400 & ME-EMULS was ordered to the site, and changed the high density Diesel Based OBM formulation of as below:

6% ME-EMULS +1.0% Organic clay +3.0% CaO+4.0% ME-TROL HT + Barite.  
Oil-Salt water ratio 85:15, Density 2.45 kg/L.

There were no pipe-stuck or serious lost circulation, etc down hole failures due to drilling fluid. The original designed average drilling cycle was 117d. After using ME-TROL HT400 & ME-EMULS, the average daily drilling footage was increased by 65% and shortened to 74 days.