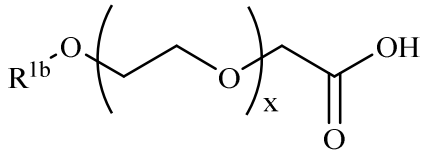
CLAIMS

1. A oil-based drilling fluid comprising:

an oil phase;

an aqueous phase;

at least one wetting agent, in which at least one wetting agent comprises a polyethylene glycol carboxylic acid surfactant according to formula (V):



(V)

where:

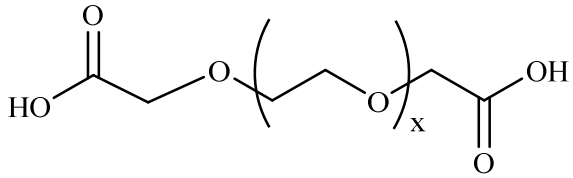
R^{1b} is a -H, alkyl, aryl, alkyl substituted aryl, or aryl substituted alkyl; and x is an integer from 10 to 453.

2. The oil-based drilling fluid of claim 1, in which the drilling fluid further comprises at least one emulsifying agent.

3. The oil-based drilling fluid according to claim 1, in which x is from 21 to 200.

4. The oil-based drilling fluid according to claim 1, in which R^{1b} a linear or branched (C_1-C_{12})alkyl chosen from methyl, ethyl, 1-methylethyl, propyl, butyl, 1,1-dimethylethyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, duodecyl.

5. The oil-based drilling fluid according to claim 1, in which R^{1b} is a radical -CH_2COOH and the wetting agent comprises a polyethylene glycol carboxylic acid surfactant according to formula (VI):



(VI)

where x is from 21 to 200.

6. The oil-based drilling fluid according to any one of claims 1 to 5, in which x is between 30 and 40.

7. The oil-based drilling fluid according to any one of claims 1 to 5, comprising based on the total weight of the oil-based drilling fluids from 10% by weight to 20% by weight base oil.

8. The oil-based drilling fluid according to any one of claims 1 to 5, comprising based on the total weight of the oil-based drilling fluids from 0.1% by weight to 2.0% by weight wetting agent.

9. The oil-based drilling fluid according to any one of claims 1 to 5, comprising based on the total weight of the oil-based drilling fluids from 0.05% by weight to 5.0% by weight emulsifier.

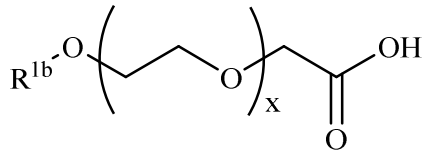
10. The oil-based drilling fluid according to any one of claims 1 to 5, further comprising based on the total weight of the oil-based drilling fluids from 0.1% by weight to 2.0% by weight rheology modifier.

11. The oil-based drilling fluid according to claim 10 in which the rheology modifier is magnesium aluminum carbonate.

12. The oil-based drilling fluid according to any one of claims 1 to 5, further comprising based on the total weight of the oil-based drilling fluids from 0.5% by weight to 2.0% by weight fluid-loss control additive.

13. A method for making an oil-based drilling fluid comprising:

mixing a base oil, at least one emulsifier, and at least one wetting agent to form a first mixture, the wetting agent comprises a polyethylene glycol carboxylic acid surfactant to form a base oil mixture, in which the polyethylene glycol carboxylic acid surfactant is in accordance with formula (V):



(V)

where:

R^{1b} is a -H, alkyl, aryl, alkyl substituted aryl, or aryl substituted alkyl; and x is an integer from 10 to 453;

optionally, mixing at least one rheology modifier, a viscosifier, and an alkalinity control agent into the base oil mixture;

optionally, mixing at least one fluid-loss control additive into the base oil mixture;

mixing a brine solution into the base oil to form a second mixture; and

mixing a weighting additive into the second mixture to form the high pressure high temperature oil-base drilling fluid.

14. A method for drilling in a subterranean formation, the method comprising:

providing an oil-based drilling fluid composition; and

introducing the oil-based drilling fluid composition into a wellbore;

wherein the oil-based drilling fluid composition comprises:

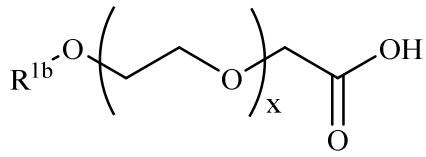
an oil phase;

an aqueous phase;

at least one wetting agent, in which at least one wetting agent comprises a polyethylene glycol carboxylic acid surfactant having 10 or more than 10 glycol repeating units; and

optionally, at least one emulsifying agent.

15. The method for drilling in a subterranean formation of claim 14, in which the wetting agent comprises a polyethylene glycol carboxylic acid surfactant according to formula (V):



(V)

where:

R^{1b} is a -H, alkyl, aryl, alkyl substituted aryl, or aryl substituted alkyl; and x is an integer from 10 to 453.