

Claims

What is claimed is:

1. An apparatus for separation of oil from oil-containing water, including;
 - a tank including a sidewall and a hollow interior;
 - a gas injection line;
 - an inlet tube extending into the tank interior and connected with the gas injection line;
 - a nozzle extending from the inlet tube into the tank interior;
 - a perforated baffle plate in the tank interior and extending radially inward with respect to the tank sidewall;
 - an outlet in the bottom of the tank; and
 - an outlet at the top of the tank.
2. The apparatus according to claim 1, further comprising a guide vane below the nozzle extending radially inward with respect to the tank sidewall.
3. The apparatus according 2, further comprising a shroud extending along the inside of the guide vane at an angle of 30° to 150° related to the guide vane.
4. The apparatus according to claim 3, wherein the perforated baffle plate is mounted inside the shroud.
5. The apparatus according to claim 1, wherein the perforated baffle plate includes uniformly distributed openings.
6. The apparatus according to claim 5, wherein the openings constitute at least 15% of the area of the perforated baffle plate.
7. The apparatus according to claim 1, wherein the perforated baffle plate extends along the plane of the horizontal cross section of the tank.

8. The apparatus according to claim 1, wherein the perforated baffle plate is mounted directly to the tank wall.
9. The apparatus according to claim 1, wherein the perforated baffle plate is mounted at any height inside the tank.
10. The apparatus according to claim 1, further comprising:
 - a plate separating the tank hollow interior into more than one chamber;
 - and
 - more than one perforated baffle plate.
11. Method for separation of oil from oil-containing produced water, comprising:
 - supplying the oil-containing produced water and mixing the oil-containing produced water with a gas-containing component;
 - feeding the gas-and-oil-containing produced water mixture to a tank interior;
 - spreading the mixture into a tank chamber;
 - equalizing the flow of the mixture in the tank by passing the mixture through a perforated baffle plate;
 - separating oil and gas with adherent oil droplets from the produced water;
 - allowing the oil and the gas with adherent oil droplets to rise to an outlet at the top of the tank and discharge from the tank; and
 - conveying cleaned produced water to an outlet in the bottom of the tank.

CLAIMS

1. An apparatus for separation of oil from oil-containing water, the apparatus comprising;
 - a tank including a sidewall and a hollow interior;
 - 5 a gas injection line (2);
 - an inlet tube (22,27) extending into the tank interior and connected with the gas injection line (2);
 - a nozzle (7) extending from the inlet tube (22,27) into the tank interior and ending tangentially along the tank sidewall;
 - 10 an outlet (12) in the bottom of the tank; and
 - an outlet (9) at the top of the tank;
 - characterised by:
 - a perforated baffle plate (41) in the tank interior, the plate mounted below the nozzle and extending radially inward with respect to the tank sidewall and
 - 15 including uniformly distributed openings to regulate and distribute downward flow of the oil-containing water.
2. The apparatus of claim 1, further comprising a guide vane (8.1) below the nozzle (7) extending radially inward with respect to the tank sidewall.
3. The apparatus of claim 2, further comprising a shroud (39) extending
- 20 along the inside of the guide vane (8.1) at an angle of 30° to 150° related to the guide vane (8.1).
4. The apparatus of claim 3, wherein the perforated baffle plate (41) is mounted inside the shroud (39).

5. The apparatus of claim 1, wherein the openings comprise at least 15% of the area of the perforated baffle plate (41).
6. The apparatus of claim 1, wherein the perforated baffle plate (41) extends along the plane of the horizontal cross section of the tank.
- 5 7. The apparatus of claim 1, further comprising:
a plate separating the tank hollow interior into more than one chamber;
and more than one perforated baffle plate (41).
8. A method of separating oil from oil-containing produced water using the apparatus of any of claims 1-7 the method comprising:
- 10 mixing the oil-containing produced water with a gas-containing component;
feeding the gas-and-oil-containing produced water mixture into a tank interior via a nozzle (7) ending tangentially along the tank sidewall;
spreading the mixture into a tank chamber;
- 15 characterised by: passing the mixture through a perforated baffle plate (41) mounted below the nozzle (7) in the tank interior the plate (41) extending radially inward with respect to the tank sidewall and including uniformly distributed perforations to regulate and uniformly distribute downward flow of the oil-containing water;
- 20 separating oil and gas with adherent oil droplets from the produced water;
allowing the oil and the gas with adherent oil droplets to rise to an outlet (9) at the top of the tank and discharge from the tank; and
conveying cleaned produced water and to an outlet (12) in the bottom of the tank.