

What is claimed is:

1. A vibratory meter (5), comprising:
 - a driver (104);
 - 5 a vibratory member (103, 103') vibratable by the driver (104);
 - at least one pickoff sensor (105, 105') configured to detect vibrations of the vibratory member (103, 103');
 - meter electronics (20) comprising an interface (301) configured to receive a vibrational response from the at least one pickoff sensor (105, 105'), and a processing
 - 10 system (303) coupled to the interface (301) configured to:
 - measure a drive gain (306) of the driver (104);
 - measure a total density (325) of a multiphase process fluid in the vibratory meter (5);
 - determine whether the drive gain (306) is below a first threshold;
 - 15 determine a liquid/liquid phase concentration allocation with the measured total density (325) if the drive gain (306) is below the first threshold, and calculate a flow rate for each liquid phase.
2. The vibratory meter (5) of Claim 1, wherein the processing system (303) is
20 configured to:
 - determine at least one of whether the drive gain (306) is below a second threshold that is greater than the first threshold, and whether the drive gain (306) is below a first drive gain noise threshold, if the drive gain (306) is above the first threshold.
- 25 3. The vibratory meter (5) of Claim 2, wherein the processing system (303) is configured to:
 - determine a solid/liquid phase concentration allocation with the measured total density (325) and a previously determined liquid density, if the measured total density
30 (325) is within a solids density range, and calculate a flow rate for each phase.

4. The vibratory meter (5) of Claim 2, wherein the processing system (303) is configured to:

5 determine a liquid/liquid phase concentration allocation with the measured total density (325), if the measured total density (325) is lower than a solids density range and within a liquids density range, and calculate a flow rate for each phase.

5. The vibratory meter (5) of Claim 2, wherein the processing system (303) is configured to:

10 determine a gas/liquid phase concentration allocation with the measured total density (325) and a previously determined liquid density, if the measured total density (325) is lower than a solids density range and within a gas density range, and calculate a flow rate for each phase.

15 6. The vibratory meter (5) of Claim 1, wherein the processing system (303) is configured to:

 determine at least one of whether the drive gain (306) is above a second threshold that is greater than the first threshold and whether the drive gain (306) is above a first drive gain noise threshold; and

20 determine a gas/liquid phase concentration allocation with the measured total density (325) and a previously determined liquid density, if the measured total density (325) is lower than a liquid density range, and calculate a flow rate for each phase.

7. A method of flowmeter phase fraction and concentration measurement adjustment comprising the steps of:

25 providing a vibratory flowmeter;
 flowing a multiphase process fluid through the vibratory flowmeter;
 measuring a drive gain of a driver of the vibratory meter;
 measuring a density of the process fluid;
 determining whether the drive gain is below a first threshold; and
30 determining a liquid/liquid phase concentration allocation of the process fluid with the measured total density if the drive gain is below the first threshold, and calculate a flow rate for each liquid phase.

8. The method of flowmeter phase fraction and concentration measurement adjustment of Claim 7, comprising the step of:

- 5 determining at least one of whether the drive gain is below a second threshold that is greater than the first threshold, and whether the drive gain is below a first drive gain noise threshold, if the drive gain is above the first threshold.

9. The method of flowmeter phase fraction and concentration measurement adjustment of Claim 8, comprising the step of:

- 10 determining a solid/liquid phase concentration allocation with the measured total density and a previously determined liquid density, if the measured total density is within a solids density range, and calculate a flow rate for each phase.

10. The method of flowmeter phase fraction and concentration measurement adjustment of Claim 8, comprising the step of:

- 15 determining a liquid/liquid phase concentration allocation with the measured total density, if the measured total density is lower than a solids density range and within a liquids density range, and calculate a flow rate for each phase.

20 11. The method of flowmeter phase fraction and concentration measurement adjustment of Claim 8, comprising the step of:

- 25 determining a gas/liquid phase concentration allocation with the measured total density and a previously determined liquid density, if the measured total density is lower than a solids density range and within a gas density range, and calculate a flow rate for each phase.

12. The method of flowmeter phase fraction and concentration measurement adjustment of Claim 7, comprising the step of:

- 30 determining at least one of whether the drive gain is above a second threshold that is greater than the first threshold and whether the drive gain is above a first drive gain noise threshold; and

determining a gas/liquid phase concentration allocation with the measured total density and a previously determined liquid density, if the measured total density is lower than a liquid density range, and calculate a flow rate for each phase.