

CLAIMS

We claim:

1. A method for operating a vibratory flowmeter comprising:
placing a process fluid in the vibratory meter;
5 measuring entrained gas in the process fluid; and
determining a measurement confidence level of at least one operating variable
based on the amount of entrained gas in the process fluid and a time interval between
fluid state recordings.
- 10 2. The method of claim 1, wherein measuring entrained gas in the process fluid
comprises determining a drive gain threshold.
3. The method of claim 2, wherein determining a drive gain threshold comprises
measuring drive gain signal over a predetermined time period.
- 15 4. The method of claim 1, wherein measuring entrained gas in the process fluid
comprises detecting periods of time comprising minimum entrained gas in the process
fluid, and wherein the measurement confidence level is lowered if the drive gain
threshold during these periods is above a predetermined threshold.
- 20 5. The method of claim 4, comprising the step of recording at least one hold value
during the periods of time having low to no entrained gas in the process fluid.
6. The method of claim 5, wherein the at least one hold value comprises at least one
25 of a flow rate and a density of the process fluid.
7. The method of claim 1, wherein measuring entrained gas in the process fluid
comprises detecting a severity of gas slugs in the process fluid, and wherein the
measurement confidence level is lowered if the severity of gas slugs is above a
30 predetermined threshold.

8. The method of claim 1, comprising the steps of:
measuring a flow rate of the process fluid; and
lowering the measurement confidence level if the measured flow rate is below a predetermined threshold.
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9. The method of claim 1, comprising the steps of:
measuring a time interval between fluid state recordings; and
lowering the measurement confidence level if the time interval is greater than a predetermined amount.
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10. The method of claim 1, comprising the steps of:
recording a plurality of hold values; and
lowering the measurement confidence level if a standard deviation of the plurality of hold values is greater than a predetermined threshold.
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11. Meter electronics (20) for a flowmeter (5) configured to receive a process fluid, the meter electronics (20) comprising an interface (201) configured to communicate with a flowmeter assembly of the flowmeter (5), and receive a vibrational response, and a processing system (203) coupled to the interface (201) comprising:
- 20 a measurement confidence routine (215) configured to:
measure an entrained gas in the process fluid; and
determine a measurement confidence level of at least one operating variable based on the amount of entrained gas in the process fluid and a time interval between fluid state recordings.
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12. The meter electronics (20) of claim 11, wherein measuring entrained gas in the process fluid comprises determining a drive gain threshold.
13. The meter electronics (20) of claim 12, wherein determining a drive gain threshold comprises measuring drive gain signal over a predetermined time period.
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14. The meter electronics (20) of claim 11, configured to detect periods of time comprising minimum entrained gas in the process fluid, and wherein the measurement confidence level is lowered if the drive gain threshold during these periods is above a predetermined level.
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15. The meter electronics (20) of claim 14, wherein the measurement confidence routine is configured to record at least one hold value during the periods of time having low to no entrained gas in the process fluid.
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16. The meter electronics (20) of claim 15, wherein the at least one hold value comprises at least one of a flow rate and a density of the process fluid.
17. The meter electronics (20) of claim 11, wherein measuring entrained gas in the process fluid comprises detecting a severity of gas slugs in the process fluid, and
15 wherein the measurement confidence level is lowered if the severity of gas slugs is above a predetermined threshold.
18. The meter electronics (20) of claim 11, wherein the measurement confidence routine is configured to:
20 measure a flow rate of the process fluid; and
 lower the measurement confidence level if the measured flow rate is below a predetermined threshold.
19. The meter electronics (20) of claim 11, wherein the measurement confidence
25 routine is configured to:
 measure a time interval between fluid state recordings; and
 lower the measurement confidence level if the time interval is greater than a predetermined amount.
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20. The meter electronics (20) of claim 11, wherein the measurement confidence routine is configured to:
 record a plurality of hold values; and

lower the measurement confidence level if a standard deviation of the plurality of hold values is greater than a predetermined threshold.