CLAIMS

What is claimed is:

1. A method for calibrating a cassette based pumping system, the method comprising:

serially installing a number of cassette analogs in the cassette based pumping system, each of the number of cassette analogs including a pump chamber region having a fixed known volume unique to the cassette analogs to which the pump chamber region belongs;

measuring, with the cassette based pumping system, the fixed known volume of the pump chamber region in each of the cassette analogs;

generating a calibration curve for volume measurements conducted with the cassette based pumping system based at least in part on the known volumes for each of the number of cassettes analogs and a corresponding measured volume of the pump chamber region for each cassette analog.

2. The method of claim 1, wherein measuring the known volume of the pump chamber region in each of the cassette analogs comprises taking a plurality of measurements of the fixed known volume of the pump chamber region of each of the cassette analogs and analyzing the plurality of measurements to determine a single value for the volume of the pump chamber region which serves as the corresponding measured volume.

3. The method of claim 2, wherein analyzing the plurality of measurements comprises averaging the plurality of measurements.

4. The method of claim 1, wherein generating the calibration curve comprises generating a best fit equation.

5. The method of claim 1, wherein generating the calibration curve comprises generating a best fit polynomial.

6. The method of claim 5, wherein the best fit polynomial is a third order polynomial.

7. The method of claim 1, wherein generating the calibration curve comprises conducting a least squares regression.

8. The method of claim 1, wherein generating the calibration curve comprises constraining at least one region of the curve to at least one limit.

9. The method of claim 8, wherein the limit is an allowable range of derivative values for points along the at least one region.

10. The method of claim 1, wherein generating the calibration curve comprises enforcing a constraint on the allowable derivative values at the zero crossing of the calibration curve.

11. The method of claim 1, wherein measuring the fixed known volume of the pump chamber region in each of the cassette analogs comprises taking a plurality of measurements of the fixed known volume of the pump chamber region of each of the cassette analogs, determining their conformance to a predefined criteria, and analyzing the plurality of measurements to determine a single value for the volume of the pump chamber region which serves as the corresponding measured volume.

12. The method of claim 11, wherein the predefined criteria is a predefined allowed variability.

13. The method of claim 11, wherein the predefined criteria is an allowed standard deviation.

14. The method of claim 1, wherein the method further comprises refining the calibration curve to a second calibration curve which accounts for volume measurement error attributable to a disposable pumping cassette.

15. The method of claim 1, wherein the method further comprises refining the calibration curve to another calibration curve which accounts for volume measurement error attributable to the head height of a fluid source or destination.