CLAIMS

What is claimed is:

1. A probe chamber, comprising:

a holder having a bore capable of holding a sensor or probe;

a chamber housing having a central bore in fluid communication with the bore of the holder, wherein the chamber housing can be joined with the holder; and

a measurement chamber in fluid communication with the central bore, wherein the measurement chamber comprises, a gate, an inlet and an outlet and is capable of receiving a probe tip or sensor tip.

2. The probe chamber of claim 1, wherein the gate is located at or near the geometric center of the terminal end of the measurement chamber.

3. The probe chamber of claim 1, wherein the gate is located such that the measurement chamber floods with a fluid in a non-preferential manner.

4. The probe chamber of claim 1, wherein the terminal end of the measurement chamber is radiused so that the measurement chamber has a volume configured to shorten a response time delay due to the measurement chamber itself.

5. The probe chamber of claim 1, wherein the chamber housing or the holder is formed of one of high-density polyethylene (HDPE), polypropylene, acrylonitrile-butadiene-styrene (ABS), nylon 6, nylon 66, nylon 46, polyacetal, or polyether sulfone.

6. The probe chamber of claim 1, wherein the chamber housing or the holder is formed of any gamma compatible and/or autoclavable material.

7. The probe chamber of claim 1 further comprising a thermoplastic elastomer at a proximal end.

8. The probe chamber of claim 1 wherein the holder has a threaded boss for receiving a probe.

9. The probe chamber of claim 1 wherein the holder and the chamber housing are joined via threads, a press-fit, a ring clip, a tri-clamp, or a snap-fit.

10. The probe chamber of any one of claims 1-9 wherein an O-ring is disposed between the holder and the chamber housing.

11. The probe chamber of claim 7 wherein the inlet is disposed adjacent to the proximal end and below the outlet.

12. The probe chamber of any one of claims 1-11 wherein the probe or sensor is a thermocouple, a pH sensor, a turbidity or absorbance sensor, or a conductivity sensor.

13. A system, comprising:

the probe chamber of claim 1; and

a sampler, wherein the sampler can be joined to the probe chamber.

14. The system of claim 13, wherein the sampler comprises a needle and having a tip for drawing a sample from the probe chamber and a tube connected thereto.

15. The system of claim 14, wherein the sampler comprises a plurality of needles and tubes.

16. The system of any one of claims 13-15, further comprising a probe or sensor housed within the probe chamber.

17. A method for calibrating a probe or sensor using the probe chamber of any one of the preceding claims, comprising:

drawing a solution sample from the measurement chamber of athe holder having the probe or sensor housed therein;

assessing and/or comparing the solution sample using reference probes;

computing a difference value; and

correcting a probe or sensor drift using the difference value.

18. The method of claim 17, wherein a needle of a sampler pierces the measurement chamber and delivers the sample solution to a test tube for testing.

19. The method of either of claims 17 or 18, wherein a response time of the probe is minimized.

20. The method of claim 17, wherein the measurement chamber or holder comprises a material gamma compatible and/or autoclavable material.

21. The method of any one of claims 17-20, wherein a flow rate of the solution into the measurement chamber is 1 to 30 mL/min, 30-100 mL/min, or 100-2000 mL/min.