CLAIMS

1. An ophthalmic device inspection system, comprising:

a single apparatus, the single apparatus including:

a processor;

a memory component communicatively coupled to the processor;

an optical inspection device communicatively coupled to the processor, wherein the optical inspection device includes a cuvette;

a center thickness (CT) measurement device communicatively coupled to the processor; and

a visual display communicatively coupled to the processor;

wherein the inspection system is configured to identify and quantify defects of an ophthalmic device and compare them to an objective level of acceptability.

2. The ophthalmic device inspection system of claim 1, wherein the cuvette further comprises a fully wet cuvette.

3. The ophthalmic device inspection system of claim 2, wherein the cuvette further comprises a magnetic cuvette positioning and retention system configured to couple the cuvette to the optical inspection device.

4. The ophthalmic device inspection system of claim 3, wherein the magnetic cuvette positioning and retention system further comprises at least one rare earth magnet molded into the cuvette and a corresponding mounting plate formed on the optical inspection device.

5. The ophthalmic device inspection system of claim 4, wherein the mounting plate formed on the optical inspection device comprises a surface exhibiting at least a 5 degree tilt relative to horizontal when the optical inspection device is disposed on a level surface.

6. The ophthalmic device inspection system of claim 2, wherein the cuvette further comprises:

a cuvette body including a plurality of side walls defining an interior volume;

a closed base coupled to the plurality of side walls, wherein the closed base includes a magnetic mount;

a plurality of saline orifices defined by the plurality of side walls;

a horizontal inlay disposed in the interior volume above the plurality of saline orifices; and

a measurement aperture formed in the interior volume above the horizontal inlays.

7. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises at least one light aperture formed in a first side wall and an opposing measurement aperture formed in an opposing side wall.

8. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises a sensor mount formed on at least one of the side walls.

9. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises a plurality of baffles or mixing plates associated with the horizontal inlay.

10. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises at least one lens positioning feature disposed on the measurement aperture.

11. The ophthalmic device inspection system of claim 10, wherein the at least one lens positioning feature disposed on the measurement aperture further comprises a plurality of datum features formed in the measurement aperture.

12. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises at least one optical lens.

13. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises an input valve fluidly coupled to a first of the plurality of saline orifices and an output valve fluidly coupled to a second of the plurality of saline orifices.

14. The ophthalmic device inspection system of claim 6, further comprising a saline pump system fluidly coupled to the cuvette.

15. The ophthalmic device inspection system of claim 14, wherein the saline pump system further comprises:

a saline pump fluidly coupled to the input valve and the output valve;

a filter; and

a bypass disposed between the saline pump and the input and output valves.

16. The ophthalmic device inspection system of claim 15, wherein the bypass is configured to be selectively actuated when measurements are taken within the cuvette.

17. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises an anti-Schlieren control.

18. The ophthalmic device inspection system of claim 6, wherein the cuvette further comprises a vibration and pulse control.

19. The ophthalmic device inspection system of claim 1, wherein the optical inspection device further comprises:

a main body including a cuvette mounting base;

a vibration isolating base;

at least one light source positioned to selectively illuminate a lens under test disposed in the cuvette when mounted on the cuvette mounting base; and

at least one camera disposed on the main body.

20. The ophthalmic device inspection system of claim 19, wherein the optical inspection device further comprises at least one vibration sensor.

21. The ophthalmic device inspection system of claim 19, wherein the at least one light source comprises at least one light emitting diode (LED).

22. The ophthalmic device inspection system of claim 21, wherein the at least one LED comprises a plurality of collimated LED's.

23. The ophthalmic device inspection system of claim 19, further comprising a light emitting diode controller.

24. The ophthalmic device inspection system of claim 19, wherein the at least one camera further comprises a side view camera and a vision and control camera.

25. The ophthalmic device inspection system of claim 24, further comprising a first light source disposed opposite the side view camera and a second light source disposed opposite the vision and control camera.

26. The ophthalmic device inspection system of claim 24, further comprising:

a Shack-Hartmann sensor; and

a beam splitter disposed opposite the second light source, a first output of the beam splitter being directed to the vision and control camera and a second output of the beam splitter being directed to the Shack Hartman sensor.

27. The ophthalmic device inspection system of claim 26, wherein the inspection system is configured to image a lens under test in at least 3 distinct light fields.

28. The ophthalmic device inspection system of claim 27, wherein the at least 3 distinct light field images are a bright field light field, a telecentric light field, and a dark field light field.

29. The ophthalmic device inspection system of claim 28, wherein the at least 3 distinct light field images are displayed on the visual display.

30. The ophthalmic device inspection system of claim 1, wherein the processor is configured to determine a saggital height of a lens under test using profilometry.

31. The ophthalmic device inspection system of claim 1, wherein the processor is configured to determine a saggital height of a lens under test using profilometry, determine the center thickness of a lens under test using the CT gauge, and determine the base curve of the lens under test.

32. The ophthalmic device inspection system of claim 1, further comprising a color interpretation module.

33. The ophthalmic device inspection system of claim 1, wherein the system incorporates both human and automated qualification.

34. The ophthalmic device inspection system of claim 1, wherein said memory includes code, which, when accessed by the processor, causes the processor to display step-by-step workflow instructions to a user on the visual display;

wherein the step-by-step workflow instructions to a user on the visual display are free of spoken or written language based instructions.

35. A cuvette for use with a contact lens inspection system as defined by claim 1, the cuvette comprising:

a cuvette body including a plurality of side walls defining an interior volume;

a closed base coupled to the plurality of side walls, wherein the closed base includes a magnetic mount;

a plurality of saline orifices defined by the plurality of side walls;

a horizontal inlay disposed in the interior volume above the plurality of saline orifices; and

a measurement aperture formed in the interior volume above the horizontal inlays.

36. The cuvette of claim 35, wherein the cuvette further comprises at least one light aperture formed in a first side wall and an opposing measurement aperture formed in an opposing side wall.

37. The cuvette of claim 35, wherein the cuvette further comprises a sensor mount formed on at least one of the side walls.

38. The cuvette of claim 35, wherein the cuvette further comprises a plurality of baffles or mixing plates associated with the horizontal inlay.

39. The cuvette of claim 35, wherein the cuvette further comprises at least one lens positioning feature disposed on the measurement aperture.

40. The cuvette of claim 39, wherein the at least one lens positioning feature disposed on the measurement aperture further comprises a plurality of datum features formed in the measurement aperture.

41. The cuvette of claim 35, wherein the cuvette further comprises at least one optical lens.

42. The cuvette of claim 35, wherein the cuvette further comprises an input valve fluidly coupled to a first of the plurality of saline orifices and an output valve fluidly coupled to a second of the plurality of saline orifices.

43. The cuvette of claim 35, further comprising a saline pump system fluidly coupled to the cuvette.

44. The cuvette of claim 35, wherein the cuvette further comprises an anti-Schlieren control.

45. The cuvette of claim 35, wherein the cuvette further comprises a vibration and pulse control.

46. An ophthalmic device inspection system, comprising:

a single apparatus, the single apparatus including:

a processor;

a memory component communicatively coupled to the processor;

an optical inspection device communicatively coupled to the processor, wherein the optical inspection device includes a cuvette, a main body including a cuvette mounting base, a vibration isolating base, at least one light source positioned to selectively illuminate a lens under test disposed in the cuvette when mounted on the cuvette mounting base, and at least one camera disposed on the main body, wherein the inspection system is configured to image a lens under test in at least 3 distinct light fields;

wherein the cuvette includes a cuvette body including a plurality of side walls defining an interior volume, a closed base coupled to the plurality of side walls, wherein the closed base includes a magnetic mount, a plurality of saline orifices defined by the plurality of side walls, a horizontal inlay disposed in the interior volume above the plurality of saline orifices, and a measurement aperture formed in the interior volume above the horizontal inlays;

a center thickness (CT) measurement device communicatively coupled to the processor; and

a visual display communicatively coupled to the processor;

wherein the inspection system is configured to identify and quantify defects of an ophthalmic device and compare them to an objective level of acceptability.