What is Claimed:

1. An aquatic environment water parameter testing system comprising:

a sample chamber portion for directly holding a liquid sample, the sample chamber portion including:

one or more walls forming a sample chamber; and

a chemical indicator element having one or more chemical indicators, the one or more chemical indicators designed and configured to indicate levels of a predetermined constituent within the liquid sample when the one or more chemical indicators is exposed to the liquid sample, the one or more chemical indicators adapted to indicate the levels by undergoing a detectable physical change, the chemical indicator element being removably connected to the aquatic water parameter testing system, the chemical indicator element including an information storage and communication element that includes the information of the identity of at least one of the one or more chemical indicators, wherein the one or more walls forms a sample chamber with one or more openings, a first opening of the one or more openings configured to receive the liquid sample, wherein the chemical indicator element is removably connectable to a second opening of the one or more openings, wherein when the chemical indicator element is connected to the second opening, the chemical indicator element closes the second opening; and

an electronics portion including:

a processing element;

an information storage and communication reader designed and configured to read the information of the identity of at least one of the one or more chemical indicators from the information storage and communication element when the chemical indicator element is connected and to provide the information of the identity of at least one of the one or more chemical indicators to the processing element; and

an optical reader designed and configured to detect the physical change and provide information of the physical change to the processing element for determining the levels of the predetermined constituent, the optical reader element designed and

configured such that a first end of the optical reader element comes into contact with the liquid sample when the liquid sample is placed in the sample chamber.

2. An aquatic environment water parameter testing system according to claim 1, wherein at least one of the one or more walls includes at least a part of an outer surface of the electronics portion.

3. An aquatic environment water parameter testing system according to claim 1 or 2, wherein when the chemical indicator element is connected, the chemical indicator element forms at least a part of the one or more walls.

~~4. An aquatic environment water parameter testing system according to claim 1, wherein when the chemical indicator element is connected, the chemical indicator element forms at least a part of the one or more walls.~~

~~5.~~4. An aquatic environment water parameter testing system according to claim 1, wherein when the chemical indicator element is connected, the chemical indicator element forms at least a part of the one or more walls and allows the sample chamber portion to hold the liquid sample.

~~6. An aquatic environment water parameter testing system according to claim 1, wherein the one or more walls forms a sample chamber with one or more openings, a first opening of the one or more openings configured to receive the liquid sample.~~

~~7. An aquatic environment water parameter testing system according to claim 6, wherein the chemical indicator element is removably connectable to a second opening of the one or more openings.~~

~~8.~~5. An aquatic environment water parameter testing system according to ~~claim 7~~claim 1, wherein the second opening is the same opening as the first opening.

~~9.~~6. An aquatic environment water parameter testing system according to ~~claim 7~~claim 1, wherein the second opening is a different opening from the first opening.

~~10. An aquatic environment water parameter testing system according to claim 7, wherein when the chemical indicator element is connected to the second opening, the chemical indicator element closes the second opening.~~

~~11.~~7. An aquatic environment water parameter testing system according to ~~claim 7~~claim 1, wherein when the chemical indicator element is connected to the second opening, the sample chamber portion is capable of holding the liquid sample and when the chemical indicator element

is not connected to the second opening, at least a part of the liquid sample escapes from the sample chamber portion due to gravity.

~~12.~~8. An aquatic environment water parameter testing system according to ~~claim 7~~claim 1, wherein the ~~first one of the one or more openings includes a door to which the~~ chemical indicator element is connectable to a door such that when the door is closed the chemical indicator element and the door close the second opening and the chemical indicator is aligned with the optical reader.

~~13.~~9. An aquatic environment water parameter testing system according to ~~claim 7~~claim 1, wherein the one or more openings is a single opening and when the chemical indicator element is connected to the second opening, the sample chamber is fully enclosed.

~~14.~~10. An aquatic environment water parameter testing system according to claim 1, wherein the information storage and communication element includes an RFID element.

~~15.~~11. An aquatic environment water parameter testing system according to claim 1, further comprising a conductivity measurement element having a first conductivity portion configured to be in contact with the liquid sample when the liquid sample is in the sample chamber and to detect a conductivity value of the liquid sample, the conductivity measurement element connected to the processing element for providing the processing element with the conductivity value.

~~16.~~12. An aquatic environment water parameter testing system according to claim ~~15~~11, wherein the processing element is configured to utilize the conductivity value and a first information stored in one or more memory elements of the aquatic environment water parameter testing system to calibrate the information of the physical change to the conductivity of the liquid sample.

~~17.~~13. An aquatic environment water parameter testing system according to claim ~~16~~12, further comprising a temperature measurement element designed and configured to detect a temperature value of the liquid sample when the liquid sample is in the sample chamber, the temperature measurement element connected to the processing element for providing the processing element with the temperature value, wherein the processing element is configured to utilize the temperature of value and a second information stored in the one or more memory elements to correct the conductivity value prior to using the conductivity value to calibrate the information of the physical change.

~~18.~~14. An aquatic environment water parameter testing system according to claim 1, further comprising a temperature measurement element designed and configured to detect a temperature value of the liquid sample when the liquid sample is in the sample chamber, the temperature measurement element connected to the processing element for providing the processing element with the temperature value.

~~19.~~15. An aquatic environment water parameter testing system according to claim 1, further comprising a water agitation element designed and configured to provide agitation to the liquid sample when the liquid sample is in the sample chamber.

~~20.~~16. An aquatic environment water parameter testing system according to claim 1, wherein the optical reader includes a light source element designed and configured to provide a first light energy to one or more of the chemical indicators and an optical sensor designed and configured to detect a second light energy that is reflected from, absorbed by, and/or emitted by the chemical indicator in response to the first light energy.

~~21.~~17. An aquatic environment water parameter testing system according to claim 1, wherein the optical reader includes a temperature sensor designed and configured to measure a temperature of the optical reader and to provide the temperature of the optical reader to the processing element, the processing element configured to utilize the temperature of the optical reader to calibrate the information of the physical change.

~~22.~~18. An aquatic environment water parameter testing system comprising:

a sample chamber portion for directly holding a liquid sample, the sample chamber portion including:

one or more walls forming a sample chamber; and

a chemical indicator element having one or more chemical indicators, the one or more chemical indicators designed and configured to indicate levels of a predetermined constituent within the liquid sample when the one or more chemical indicators is exposed to the liquid sample, the one or more chemical indicators adapted to indicate the levels by undergoing a detectable physical change; and

an electronics portion including:

a processing element;

a conductivity measurement element having a first portion configured to be in contact with the liquid sample when the liquid sample is in the sample chamber and to

detect a conductivity value of the liquid sample, the conductivity measurement element connected to the processing element for providing the processing element with the conductivity value; and

an optical reader designed and configured to detect the physical change and provide information of the physical change to the processing element, the processing element configured to use the conductivity value to calibrate the information of the physical change to the conductivity of the liquid sample and to determine the levels of the predetermined constituent.

~~23.~~19. An aquatic environment water parameter testing system according to claim ~~22~~18, further comprising a temperature measurement element configured to detect a temperature value of the liquid sample when the liquid sample is in the sample chamber, the temperature measurement element connected to the processing element for providing the processing element with the temperature value, the processing element configured to utilize the temperature value to correct the conductivity value for the temperature of the liquid sample prior to using the conductivity value to calibrate the information of the physical change.

~~24.~~20. A method of determining the level of a constituent in an aquatic environment, the method comprising:

providing a liquid sample of the aquatic environment for analysis;

determining the conductivity of the liquid sample;

exposing a chemical indicator of a chemical indicator element to the liquid sample;

measuring an optical reading from the chemical indicator; and

correcting the optical reading using the conductivity of the liquid sample.

~~25.~~21. A method according to claim ~~24~~20, further comprising:

determining the temperature of the liquid sample; and

correcting the conductivity using the temperature of the liquid sample prior to correcting the optical reading.

~~26.~~22. A method according to claim ~~24~~20, further comprising:

determining a temperature of an optical reader used in the measuring an optical reading from the chemical indicator; and

correcting the optical reading using the temperature of the optical reader prior to the correcting the optical reading using the conductivity of the liquid sample.

~~27.~~23. A method according to claim ~~26~~22, further comprising:

determining the temperature of the liquid sample; and

correcting the conductivity using the temperature of the liquid sample prior to correcting the optical reading.

~~28.~~24. A chemical indicator element for use in an aquatic environment water parameter testing system having a light source capable of generating an excitation energy and a light sensor for detecting light, the chemical indicator element comprising:

a chemical indicator responsive to a first excitation energy to generate a first emitted energy in response to the first excitation energy; ~~and~~

a thin film material having a first side and a second side, the chemical indicator associated with the first side, the thin film material being configured to:

absorb and/or allow transmission of one or more wavelengths of light of the first excitation energy, and

reflect one or more wavelengths of light of the first emitted energy; and

a backing material, the backing material positioned adjacent the second side of the thin film material, the backing material being a material that absorbs one or more wavelengths of light of the first excitation energy.

~~29. A chemical indicator element according to claim 28, further comprising a backing material, the backing material positioned adjacent the second side of the thin film material, the backing material being a material that absorbs one or more wavelengths of light of the first excitation energy.~~

~~30.~~25. A chemical indicator element according to ~~claim 29~~ claim 24, further comprising a holder positioned adjacent a side of the backing material that is opposite a side of the backing material adjacent to the second side of the thin film material.

~~31.~~26. A chemical indicator element according to ~~claim 29~~ claim 24, further comprising a holder positioned adjacent a side of the chemical indicator that is opposite a side of the chemical indicator adjacent to the first side of the thin film material, the holder including a material that allows transmission of the first excitation energy.

~~32.~~27. A chemical indicator element according to claim ~~28~~24, further comprising a holder positioned adjacent the second side of the thin film material, the holder including a material that absorbs one or more wavelengths of light of the first excitation energy.

~~33.~~28. A chemical indicator element according to claim ~~28~~24, wherein the thin film material transmits light with a wavelength below about 490 nm such that about 10 percent of light with a wavelength about 490 nm is reflected and the thin film material reflects about 80 percent of light having a wavelength of 520 nm and above.

~~34.~~29. A chemical indicator element according to claim ~~28~~24, wherein the thin film material has a reflectivity profile with a narrow band of reflectivity including a wavelength of light of the first emitted energy and a narrow band of absorption and/or transmission including a wavelength of light of the first excitation energy.

~~35.~~30. A chemical indicator element according to claim ~~28~~24, wherein the chemical indicator element is part of a sample chamber portion of an aquatic environment water parameter testing system, the aquatic environment water parameter testing system having an optical reader element positioned opposite the chemical indicator element such that a light from the optical reader element is directed at the chemical indicator at a side of the chemical indicator opposite the thin film material and light emitted from the chemical indicator is readable by the optical reader element.

~~36.~~31. A chemical indicator element according to claim ~~28~~24, wherein the chemical indicator element is configured to be removably attached to a sample chamber portion of an aquatic environment water parameter testing system, the aquatic environment water parameter testing system having an optical reader element positioned opposite the chemical indicator element such that a light from the optical reader element is directed at the chemical indicator at a side of the chemical indicator opposite the thin film material and light emitted from the chemical indicator is readable by the optical reader element.

~~37.~~32. A chemical indicator element according to claim ~~28~~24, wherein the chemical indicator element is configured to be removably attached to an aquatic environment water parameter testing system, the aquatic environment water parameter testing system having an optical reader element positioned opposite the chemical indicator element such that a light from the optical reader element is directed at the chemical indicator at a side of the chemical indicator opposite the thin film material and light emitted from the chemical indicator is readable by the optical reader element.

33. An aquatic environment water parameter testing system comprising:

a sample chamber portion for directly holding a liquid sample, the sample chamber portion including:

one or more walls forming a sample chamber; and

a chemical indicator element having one or more chemical indicators, the one or more chemical indicators designed and configured to indicate levels of a predetermined constituent within the liquid sample when the one or more chemical indicators is exposed to the liquid sample, the one or more chemical indicators adapted to indicate the levels by undergoing a detectable physical change, the chemical indicator element being removably connected to the aquatic water parameter testing system, the chemical indicator element including an information storage and communication element that includes the information of the identity of at least one of the one or more chemical indicators, wherein the one or more walls forms a sample chamber with one or more openings, a first opening of the one or more openings configured to receive the liquid sample, wherein the chemical indicator element is removably connectable to a second opening of the one or more openings, wherein the second opening is the same opening as the first opening; and

an electronics portion including:

a processing element;

an information storage and communication reader designed and configured to read the information of the identity of at least one of the one or more chemical indicators from the information storage and communication element when the chemical indicator element is connected and to provide the information of the identity of at least one of the one or more chemical indicators to the processing element; and

an optical reader designed and configured to detect the physical change and provide information of the physical change to the processing element for determining the levels of the predetermined constituent, the optical reader element designed and configured such that a first end of the optical reader element comes into contact with the liquid sample when the liquid sample is placed in the sample chamber.

34. An aquatic environment water parameter testing system according to claim 32, wherein at least one of the one or more walls includes at least a part of an outer surface of the electronics portion.

35. An aquatic environment water parameter testing system according to claim 33 or 34, wherein when the chemical indicator element is connected, the chemical indicator element forms at least a part of the one or more walls.

36. An aquatic environment water parameter testing system according to claim 33, wherein when the chemical indicator element is connected, the chemical indicator element forms at least a part of the one or more walls and allows the sample chamber portion to hold the liquid sample.

37. An aquatic environment water parameter testing system according to claim 36, wherein when the chemical indicator element is connected to the second opening, the chemical indicator element closes the second opening.

38. An aquatic environment water parameter testing system according to claim 36, wherein when the chemical indicator element is connected to the second opening, the sample chamber portion is capable of holding the liquid sample and when the chemical indicator element is not connected to the second opening, at least a part of the liquid sample escapes from the sample chamber portion due to gravity.

39. An aquatic environment water parameter testing system according to claim 36, wherein the chemical indicator element is connectable to a door such that when the door is closed the chemical indicator element and the door close the second opening and the chemical indicator is aligned with the optical reader.

40. An aquatic environment water parameter testing system according to claim 36, wherein the one or more openings is a single opening and when the chemical indicator element is connected to the second opening, the sample chamber is fully enclosed.

41. An aquatic environment water parameter testing system according to claim 33, wherein the information storage and communication element includes an RFID element.

42. An aquatic environment water parameter testing system according to claim 32, further comprising a conductivity measurement element having a first conductivity portion configured to be in contact with the liquid sample when the liquid sample is in the sample chamber and to detect a conductivity value of the liquid sample, the conductivity measurement element

connected to the processing element for providing the processing element with the conductivity value.

43. An aquatic environment water parameter testing system according to claim 42, wherein the processing element is configured to utilize the conductivity value and a first information stored in one or more memory elements of the aquatic environment water parameter testing system to calibrate the information of the physical change to the conductivity of the liquid sample.

44. An aquatic environment water parameter testing system according to claim 43, further comprising a temperature measurement element designed and configured to detect a temperature value of the liquid sample when the liquid sample is in the sample chamber, the temperature measurement element connected to the processing element for providing the processing element with the temperature value, wherein the processing element is configured to utilize the temperature of value and a second information stored in the one or more memory elements to correct the conductivity value prior to using the conductivity value to calibrate the information of the physical change.

45. An aquatic environment water parameter testing system according to claim 32, further comprising a temperature measurement element designed and configured to detect a temperature value of the liquid sample when the liquid sample is in the sample chamber, the temperature measurement element connected to the processing element for providing the processing element with the temperature value.

46. An aquatic environment water parameter testing system according to claim 32, further comprising a water agitation element designed and configured to provide agitation to the liquid sample when the liquid sample is in the sample chamber.

47. An aquatic environment water parameter testing system according to claim 32, wherein the optical reader includes a light source element designed and configured to provide a first light energy to one or more of the chemical indicators and an optical sensor designed and configured to detect a second light energy that is reflected from, absorbed by, and/or emitted by the chemical indicator in response to the first light energy.

48. An aquatic environment water parameter testing system comprising:

a sample chamber portion for directly holding a liquid sample, the sample chamber portion including:

one or more walls forming a sample chamber; and

a chemical indicator element having one or more chemical indicators, the one or more chemical indicators designed and configured to indicate levels of a predetermined constituent within the liquid sample when the one or more chemical indicators is exposed to the liquid sample, the one or more chemical indicators adapted to indicate the levels by undergoing a detectable physical change, the chemical indicator element being removably connected to the aquatic water parameter testing system, the chemical indicator element including an information storage and communication element that includes the information of the identity of at least one of the one or more chemical indicators, wherein the one or more walls forms a sample chamber with one or more openings, a first opening of the one or more openings configured to receive the liquid sample, wherein the chemical indicator element is removably connectable to a second opening of the one or more openings, wherein when the chemical indicator element is connected to the second opening, the sample chamber portion is capable of holding the liquid sample and when the chemical indicator element is not connected to the second opening, at least a part of the liquid sample escapes from the sample chamber portion due to gravity; and

an electronics portion including:

a processing element;

an information storage and communication reader designed and configured to read the information of the identity of at least one of the one or more chemical indicators from the information storage and communication element when the chemical indicator element is connected and to provide the information of the identity of at least one of the one or more chemical indicators to the processing element; and

an optical reader designed and configured to detect the physical change and provide information of the physical change to the processing element for determining the levels of the predetermined constituent, the optical reader element designed and configured such that a first end of the optical reader element comes into contact with the liquid sample when the liquid sample is placed in the sample chamber.

49. An aquatic environment water parameter testing system comprising:

a sample chamber portion for directly holding a liquid sample, the sample chamber portion including:

one or more walls forming a sample chamber; and

a chemical indicator element having one or more chemical indicators, the one or more chemical indicators designed and configured to indicate levels of a predetermined constituent within the liquid sample when the one or more chemical indicators is exposed to the liquid sample, the one or more chemical indicators adapted to indicate the levels by undergoing a detectable physical change, the chemical indicator element being removably connected to the aquatic water parameter testing system, the chemical indicator element including an information storage and communication element that includes the information of the identity of at least one of the one or more chemical indicators; and

an electronics portion including:

a processing element;

an information storage and communication reader designed and configured to read the information of the identity of at least one of the one or more chemical indicators from the information storage and communication element when the chemical indicator element is connected and to provide the information of the identity of at least one of the one or more chemical indicators to the processing element; and

an optical reader designed and configured to detect the physical change and provide information of the physical change to the processing element for determining the levels of the predetermined constituent, the optical reader element designed and configured such that a first end of the optical reader element comes into contact with the liquid sample when the liquid sample is placed in the sample chamber, wherein the optical reader includes a temperature sensor designed and configured to measure a temperature of the optical reader and to provide the temperature of the optical reader to the processing element, the processing element configured to utilize the temperature of the optical reader to calibrate the information of the physical change.

50. A chemical indicator element for use in an aquatic environment water parameter testing system having a light source capable of generating an excitation energy and a light sensor for detecting light, the chemical indicator element comprising:

a chemical indicator responsive to a first excitation energy to generate a first emitted energy in response to the first excitation energy;

a thin film material having a first side and a second side, the chemical indicator associated with the first side, the thin film material being configured to:

absorb and/or allow transmission of one or more wavelengths of light of the first excitation energy, and

reflect one or more wavelengths of light of the first emitted energy; and

a holder positioned adjacent the second side of the thin film material, the holder including a material that absorbs one or more wavelengths of light of the first excitation energy.

51. A chemical indicator element for use in an aquatic environment water parameter testing system having a light source capable of generating an excitation energy and a light sensor for detecting light, the chemical indicator element comprising:

a chemical indicator responsive to a first excitation energy to generate a first emitted energy in response to the first excitation energy; and

a thin film material having a first side and a second side, the chemical indicator associated with the first side, the thin film material being configured to:

absorb and/or allow transmission of one or more wavelengths of light of the first excitation energy, and

reflect one or more wavelengths of light of the first emitted energy,

wherein the thin film material transmits light with a wavelength below about 490 nm such that about 10 percent of light with a wavelength about 490 nm is reflected and the thin film material reflects about 80 percent of light having a wavelength of 520 nm and above.

52. A chemical indicator element for use in an aquatic environment water parameter testing system having a light source capable of generating an excitation energy and a light sensor for detecting light, the chemical indicator element comprising:

a chemical indicator responsive to a first excitation energy to generate a first emitted energy in response to the first excitation energy; and

a thin film material having a first side and a second side, the chemical indicator associated with the first side, the thin film material being configured to:

absorb and/or allow transmission of one or more wavelengths of light of the first excitation energy, and

reflect one or more wavelengths of light of the first emitted energy

wherein the thin film material has a reflectivity profile with a narrow band of reflectivity including a wavelength of light of the first emitted energy and a narrow band of absorption and/or transmission including a wavelength of light of the first excitation energy.

53. A chemical indicator element for use in an aquatic environment water parameter testing system having a light source capable of generating an excitation energy and a light sensor for detecting light, the chemical indicator element comprising:

a chemical indicator responsive to a first excitation energy to generate a first emitted energy in response to the first excitation energy; and

a thin film material having a first side and a second side, the chemical indicator associated with the first side, the thin film material being configured to:

absorb and/or allow transmission of one or more wavelengths of light of the first excitation energy, and

reflect one or more wavelengths of light of the first emitted energy,

wherein the chemical indicator element is part of a sample chamber portion of an aquatic environment water parameter testing system, the aquatic environment water parameter testing system having an optical reader element positioned opposite the chemical indicator element such that a light from the optical reader element is directed at the chemical indicator at a side of the chemical indicator opposite the thin film material and light emitted from the chemical indicator is readable by the optical reader element.

54. A chemical indicator element for use in an aquatic environment water parameter testing system having a light source capable of generating an excitation energy and a light sensor for detecting light, the chemical indicator element comprising:

a chemical indicator responsive to a first excitation energy to generate a first emitted energy in response to the first excitation energy; and

a thin film material having a first side and a second side, the chemical indicator associated with the first side, the thin film material being configured to:

absorb and/or allow transmission of one or more wavelengths of light of the first excitation energy, and

reflect one or more wavelengths of light of the first emitted energy,

wherein the chemical indicator element is configured to be removably attached to an aquatic environment water parameter testing system, the aquatic environment water parameter testing system having an optical reader element positioned opposite the chemical indicator element such that a light from the optical reader element is directed at the chemical indicator at a side of the chemical indicator opposite the thin film material and light emitted from the chemical indicator is readable by the optical reader element.